HELSINKI SCHOOL OF ECONOMICS (HSE)
Department of Accounting and Finance

Returns-Earnings Relation in Finland 1990-2002: Cross-Sectional Differences in Price Anticipation of Earnings

Finance
Master´s thesis
Jaakko Somersalmi
Spring 2004

Approved by the Council of the Department 25 / 5 2004 and awarded the grade excellent 80 points

KTT Sami Torstila KTT Vesa Puttonen

Helsinki School of Economics
Master's thesis
Jaakko Somersalmi

Abstract
May 11, 2004

Return-Earnings Relation in Finland 1990-2002: Cross-Sectional Differences in Price Anticipation of Earnings

Objectives of the Study

In an association study, the contemporaneous relationship between stock returns and accounting earnings is often modelled as a regression between the unexpected earnings of a financial year regressed on the corresponding year's returns. Because accounting income incorporates value-relevant information with a lag and the market becomes aware of these events before accounting earnings are released, it is possible to strengthen the returns earnings relation and the magnitude of the earnings response coefficient (ERC) by including leading period returns in the dependent variable, i.e. prices lead earnings. This study aims to provide evidence on the ability of prices to lead earnings in Finland by using the latest stock market data from the period 1990-2002. Additionally, it will be tested whether there are cross-sectional differences in the way in which adding leading period returns enhances the ERC. The ability of prices to lead earnings is hypothesised to be related to the quality of a firm's information environment, which is proxied by size measured by market value, trading volume in a firm's share and the relative amount of relationship financing.

Data

The sample comprises of 27 companies that have been continuously listed on the Helsinki Stock Exchange (HEX) Main List between 1.4.1990-1.4.2002. Stock return, price and trading data are retrieved from the HEX database at use in Helsinki School of Economics (HSE). Annual earnings observations and other financial information data are collected from the Research Institute for the Finnish Economy (RIFE) database or from the companies' official annual accounts available for public viewing at the National Board of Patents and Registration.

Results

Most of the increase in the explanatory power of the tested regressions and the absolute magnitude of the ERCs stems from adding two leading years' returns to the dependent variable, which is coherent with previous international (US, UK) evidence and analysts' typical earnings forecast horizon in Finland. This implies that stock prices impound information in a similar manner relative to accounting earnings as in other large stock exchanges despite HEX being a relatively small and illiquid market place. When leading period returns are added to the dependent variable the ERCs increase least for firms that are small measured by market value or have had least amount of trading in their share. The amount of relationship capital, measured by loans from financial institutions divided by total assets, influences the returns earnings relation in such a way that ERCs of firms with a high amount of relationship capital increase the least when leading period returns are added and ERCs of firms with a low amount of relationship capital increase the most when leading period returns are added.

Keywords

association study, earnings response coefficient, information environment, prices leading earnings

TABLE OF CONTENTS

1. INTRODUCTION

Companies earnings announcements are one of the most widely covered financial news and highlight the importance given to accounting earnings as a specific performance measure. Given the massive coverage related to earnings it would be logical to assume that they contain information, which is of the highest relevance to firm outsiders. As it is, market specialists express their believes about the future of companies almost always by means of earning forecasts and managers' compensation is often determined by earnings or earnings related measures. Consequently, recognising the value relevance of accounting numbers is of great importance for institutions developing accounting practices and rules in their work of "bettering" the quality of earnings in terms of investor value relevance. Therefore, it is only natural that the usefulness of earnings to investors is one of the oldest and concerted research fields in accounting history.

Usefulness of information can be understood in many different ways but in financial research the research conducted in the field was quite early established on measuring the way in which information conveyed by earnings was reflected in security prices. The earliest and one of the most quoted studies being the paper published by Ball and Brown (1968), in which the authors stated that *"recent developments in capital theory provide justification for selecting the behaviour of security prices as an operational test of usefulness"*. Ball and Brown assumed, relying on an impressive amount of theory, that capital markets are efficient and unbiased in forming asset prices based on available useful information. Accordingly, prices of securities would then adjust quickly to an earnings announcement conditionally on the earnings having any importance to investors (new information). In a similar tone, Fama (1970) stresses the fact that investors do not need to worry about security prices being reasonable or not if they can assume that prices already fully reflect all available information.

The concept of earnings response coefficient (ERC) has been widely used in accounting studies since the late 1980s. An ERC associates unexpected earnings with unexpected returns, since we assume rational expectations about future earnings to already be reflected in security prices. Therefore, it seems reasonable to correlate the change in price (return) with unexpected earnings (new information) rather than with reported earnings [Lev (1989)]. Generally, the following (1) linear regression model is used to estimate the association between returns and earnings:

$$CAR_{it} = a + \beta UX_{it} + e_{it} \quad (1)$$

CAR being the risk-adjusted return for security *i* over period *t*, *UX* a measure of unexpected earnings and *e* a random disturbance term respectively. The slope coefficient β is called the earnings response coefficient (ERC). The returns earnings association can be measured either by using a return cumulation period which (i) coincide with both the earnings measurement period and report period, and (ii) coincide with only the earnings report or event period (usually two or three days around the earnings announcement). The former are called association studies and the latter event studies. Normally, empirical papers run tests to obtain ERCs that are afterwards compared to a hypothesized theoretical level based on a valuation model. Another frequently used way of displaying returns earnings regression results is to report the explanatory power (R^2) of the model.

Despite the huge amount of time and effort devoted to the studies on the returns earnings relationship, most of the empirical findings still suggest that while investors do use earnings the extent of their usefulness is rather limited based on a contemporaneous regression (financial year's unexpected accounting earnings regressed on the corresponding year's unexpected returns; association study). However, several papers published in the 1990s discuss the possible problems in measuring the returns-earnings relation and offer various methods for practitioners to increase the strength of the association. One of them is to increase the time interval for calculation of returns if it is assumed that the weak relationship is due to earnings' lack of timeliness in capturing value-relevant events. Empirically it means that a financial year's accounting earnings are not only an explanatory variable for the corresponding year's returns, but previous years' returns are included in the dependent variable. This was first suggested by Beaver et al. (1980) and several other papers afterwards have taken into account the so called lead-lag structure between earnings and returns e.g. Collins and Kothari (1989) were able to significantly increase the observed returns-earnings relation for NYSE firms. In Finland, several papers [see Martikainen and Puttonen (1993), Martikainen et al. (1993), Kallunki and Martikainen (1997)] have covered the phenomenon and found out that there is a similar effect of stock returns predicting accounting earnings for Helsinki Stock Exchange companies.

The amount of value-relevant information available to investors about a firm is related to the quality of the firm's information environment. The 'better' the quality, the more accurately investors are able to anticipate the future development of a firm's operations and hence the more accurately they

are able to predict value-relevant events which will be realised in the accounting earnings of future periods. This will lead stock markets to price the shares of firms that have a high quality information environment more accurately in relation to actual future performance reflected in accounting amounts. Empirically the phenomenon is referred to as 'prices leading earnings'. Some factors that are related to the quality of a firm's information environment can be hypothesized to have an effect on the ability of its stock price to lead earnings. These include size, trading volume and earnings persistence among others [Collins et al. (1987), Donnelly and Walker (1995), Donnelly (1998)].

Other explanations apart from the 'prices leading earnings' for the weak observed relationship between returns and earnings include capital market inefficiency, deficient-GAAP and composition of earnings. In general, all of the explanations have support among academics and some evidence has been found to support all of the hypotheses. However, to date none of the explanations seem to stand out among the others.

1.1 Objectives of The Study

My study plans to add to the current ERC research by using the latest data from the Finnish stock market (Helsinki Stock Exchange, HEX). Several papers have previously shown that, as in larger international markets, security returns lead earnings also in Finland. My objective is to study in detail what the cross-sectional determinants of this lead-lag phenomenon are. The subject has not been previously studied in Finland, although the behaviour of a relatively small and illiquid stock market in terms of price formation relative to future period accounting information might be particularly interesting.

This paper can be seen as an extension to the work done previously in Finland regarding the characteristics of the prices lead earnings phenomenon. More specifically, in both Martikainen et al. (1993) and Kallunki and Martikainen (1997) the authors note that in the two consecutive sub periods studied the price anticipation seems to increase in the latter. If, as Kallunki and Martikainen (1997) state, the change in the lead-lag structure between the two sub periods 1988-1990 and 1991-1993 [1977-1981, 1982-1986 in Martikainen et al. (1993)] can be explained by the development of the infrastructure of the Finnish stock market, study using recent Finnish data should yield interesting results over the ability of the Finnish stock market to reflect earnings information in prior stock price data. During the 1990s the Finnish stock market has experienced substantial

growth, restrictions on foreign share ownership have been abolished (1993), the accounting legislation has been revised twice (1992,1997) the goal being to harmonize Finnish GAAP to EU and IAS standards.

More importantly, unlike previous ERC studies in Finland, the empirical part of the paper will test hypothesis related to cross-sectional determinants that can be used to explain the quality of a firm's information environment and thus the ability of its share price to predict earnings. Size measured by market value [Collins et al. (1987), Donnelly and Walker (1995), Donnelly (1998)] as well as the amount of trading in a firm's share [Donnelly (1998)] are variables that have been tested and found to be significant in an international context. This study will additionally contribute to the ERC research field by testing for the effect of the relative amount of relationship capital to the quality of a firm's information environment. Building on the findings of Seppänen (1999), it is hypothesized that in Finland firms which have continuously held a strong relationship with their main source of finance (in practice a bank) give less frequent and value-relevance public disclosure. These firms will consequently have a lower quality information environment and have lower ERCs when leading period returns are added to the dependent variable in a returns earnings regression, i.e. their share prices will have a lesser ability to predict earnings.

1.2 Structure of The Study

Following the introduction, I will move to cover the main developments of the capital market based accounting research field to date in Chapter 2. I feel that it is important for the reader to get a general idea of the logic behind the development and reasoning of accounting variable use in empirical research. Section 2.2 will deal with market efficiency and the problematic of the assumption of informational efficiency in relation to empirical studies in capital market based accounting research and obtained research findings.

Chapter 2.3 will treat the disclosure literature and concentrates in linking the amount of disclosure to the informational environment of an individual firm. Special attention is given to accounting disclosure and its features, keeping in mind that understanding the process which defines earnings properties has a central role in returns earnings studies. Finnish accounting legislation, its features and developments, are also reviewed.

Chapter 2.4 discusses the earlier research findings concerning ERCs and lists the determinants that have been detected to be associated with the magnitude of the return earnings relation either using an association or event study methodology. In Chapter 3 the central method of including leading returns in the returns earnings regression to improve the magnitude of the ERC is presented. It is followed by the discussion of a firm's informational environment, which effectively shapes the amount of information impounded into security prices prior to the official release of annual accounting earnings. Factors that are hypothesized to affect the amount and quality of information available about a firm are presented. Consequently, hypothesis tested in the empirical part of the study are derived.

In Chapter 4 the methodology used in the study as well as the theoretical link between earnings and returns are discussed. The section is intended to give a general idea of how the research field reasons the use of earnings as determinants for returns through a valuation model and what the theoretical ERC values from empirical regression given the models should be.

Data selection and the data used in the empirical part of the study is presented in Chapter 5. Empirical results and findings are presented in Chapter 6 and Chapter 7 draws conclusions based on the previous chapter and its findings.

2. THEORY AND PREVIOUS RETURNS EARNINGS RESEARCH

2.1 Capital Market Based Accounting Research – An Overview

Dumontier et al. (2002) state that the primary objective of capital market based accounting research (they call it "the accounting based capital market research") has been to assess whether accounting data provide value-relevant information to investors, incremental to all other sources of publicly available information. The information content of accounting numbers is inferred from changes in the level or in the variability of stock prices. Argumentation in relation to accounting studies is usually based on the Efficient Market Hypothesis (EMH), which states that market prices fully reflect all publicly available information [Fama (1970)]. In this respect it seems odd that investors spend considerable effort in finding mispriced stocks or that managers seek to boost stock prices by hiding bad news in footnotes. The EMH argues, simply put, that no matter how obscure the presentation of accounting information it will already be reflected in stock prices.

The actual development of the capital market based accounting research can be traced back to the 1960s. Until the mid-1960s accounting theory was generally normative and there was little emphasis on the empirical validity of the underlying accounting theory's predictions. As in Hendriksen (1965), the importance was laid on the development of procedures and techniques that best fulfil the objectives of accounting and the first steps in developing an accounting theory was thus to clearly define those objectives. This led to all logically consistent theories to be regarded as useful depending on the objectives that one defined for accounting. However, disagreement about the actual objectives of accounting led to no clear consensus existing over accounting policies. This caused scepticism towards numbers produced by accounting and the earning reported in financial statements. Hendriksen (1965) predicts that the income statement will see its demise if there are no drastic changes to the story it tells in the future.

Kothari (2001), in his extensive review of the capital markets research in accounting, lists three developments that facilitated the birth of capital market based accounting research and the important seminal papers by Ball and Brown (1968) and Beaver (1968) in the late 1960s: (i) positive economics theory, (ii) the efficient market hypothesis and (iii) the event study of Fama et al. (1969). Positive economics theory describes science as the development of a "theory" or a

"hypothesis" that yields valid and meaningful predictions about phenomena yet to be observed. Therefore, as Watts and Zimmerman (1986) state, "the objective of accounting theory is to explain and predict". With the efficient market hypothesis came the theoretical basis for using capital market values as a test of usefulness. Compared to normative accounting practices, researchers now had a given objective or external outcome from which to infer whether information in accounting reports was used by market participants and considered valid. The event study of Fama et al. (1969) was one of the first in its kind in financial economics and introduced the concept of relating security returns to different firm specific economic events such as earnings announcements. All of the above factors gave accounting researchers a new base to build on and the following decades have seen a vast number of papers devoted to capital market based accounting research.

The objective of the studies that follow Ball and Brown (1968) is usually to assess whether the accounting earnings determination process captures the factors that affect security prices, with the maintained hypothesis that capital markets are informationally efficient. In fact, early evidence widely led researchers to believe that the issue of market efficiency towards publicly available information had been resolved. Thus, it was only natural that following the 1960's breakthrough in theory and methodology researchers were eager to find new ways of exploring the market based accounting field. Beaver (1972) suggested that the association of accounting numbers with security returns can be used to rank alternative accounting methods as a means of determining the accounting method that should become a standard. Such standard-setting approach has since been questioned by many academics, recently e.g. Holthausen and Watts (2001) have thoroughly covered the question and continue to posit that valuation literature alone should not be used to derive standard-setting implications in lack of better underlying descriptive theories for accounting. According to Holthausen and Watts (2001), just assuming that standard-setters consider a high association between market returns and accounting numbers a desirable feature is not enough justification for scientific research.

Coming into the 1980's and 1990's it was recognised that the early view of efficient capital markets from an accounting information perspective had to be questioned and researchers were mostly looking for new ways to explain the apparently low association between market values and accounting numbers. In relation to earnings the early view of constant ERCs across firms and over-time was relaxed and studies focused on such issues as the predictability of the earnings series, systematic risk and the perceived noisiness of earnings series. In this respect, Kormendi and Lipe (1987) is an important paper and builds on the study by Miller and Rock (1985) to test whether

time-series properties, in specific persistence, of earnings are important in explaining ERC magnitudes across firms. If investors consider most of the earnings innovation to be transitory it will not cause them to revise their future cash-flow expectations accordingly. This could be the result of a one-time business activity such as an asset sale. Basu (1997) stresses that because of information asymmetry between managers and investors there is demand and supply for conservative accounting numbers. Therefore, earnings are likely to reflect bad news more quickly than good news. In a similar tone Hayn (1995) proved that losses can been interpreted as transitory or negative earnings and they are not expected to continue indefinitely since shareholders have a put-option on the assets of the firm. Hence they will liquidate the firm rather than suffer continued losses and in essence losses will distort the observed returns earnings relation.

Easton and Zmijewski (1989) suggested the idea of expected rate of return being an important determinant of ERCs, since revisions in future cash-flows are discounted at that rate. Comparing earnings, cash-flows and accruals association with stock market returns was also a popular subject and studies in long-window context include Rayburn (1986) and Livnat and Zarowin (1990). These studies were motivated by the supposedly relatively crude measure of cash-flows used in the earlier studies and they mostly support the argument of accruals containing incremental information over cash-flows. Other authors tested for e.g. the significance of a firm's life-cycle or investment decisions on the ERC. In general, advances were mostly made in a statistical respect as academics tried to improve on the low association that seemingly looked like an empirical problem since the returns earnings link could be quite strongly proved in theoretic terms.

Still, a popular explanation for the low observed ERCs has been capital market inefficiency. If markets do not interpret the information contained in earnings correctly the result will be a lower than expected returns earnings relation. Some of the empirical findings in the finance research field, such as the post-announcement drift [e.g. Foster et al. (1986) and Bernard and Thomas (1989)], seem to support this argument. However, as Kothari (2001) notes, unless there is a logically consistent inefficient market theory that predicts under reaction to earnings information such explanations should be tempered since overreaction is at least likely without an explanatory model.

Lev [see e.g. Lev (1989), Lev and Zarowin (1999)] has in several papers taken a strong stand for the deficient-GAAP argument, which states that GAAP produces low-quality earnings that exhibit little correlation with security returns. This is a similar standpoint to the prices leading earnings argument since it also lies on the low contemporaneous relationship between capital market values and

current earnings. In general following the deficient GAAP argument posits that the quality of any given GAAP would be bettered by increasing the contemporaneous ERCs. As discussed earlier, e.g. Holthausen and Watts (2001) note that the reasons why standard setters should pursue that particular objective are not very well proven logically in the current research.

Barth et al. (2001), as active researchers in the value relevance field, point out that contrary to the opinions raised in Holthausen and Watts (2001) standard setters might find the value relevance literature useful. They argue that instead of offering any simplified answers to standard setting, value relevance literature offers "fruitful insights" into questions of interests, views that can help the work of standard setters. Barth et al. (2001) emphasise that e.g. the FASB in the US sees equity investment as a primary focus for standard setters and whether financial statements are used for other purposes, such as contracting, in no way diminishes the importance of value relevance research. In summary they conclude that the challenge of value relevance research remains to make a substantive contribution in addressing questions relevant to standard setting as financial markets expand and become more complex.

2.1.1 The Return Window: Event Studies – Association Studies

The empirical research covering accounting earnings and stock returns can basically be divided into two groups: event studies and association studies. Both types of studies are common in the literature.

Event studies measure stock market reactions to events such as earnings announcements using a narrow window and try to explain whether they convey explicit information about future cash-flows. Specifically, if the level or variability of prices changes around the event date, then the conclusion is that the accounting event conveys new information about the amount, timing and/or uncertainty of future cash flows that revised the market's previous expectations. It follows that when conducting an event study a researcher expects capital markets to adjust quickly to the introduction of new information, i.e. the market's are assumed to be informationally efficient. In the returns-earnings context event studies in practice concentrate on a few days before and after (such as –3, +3) the earnings announcement. One of the pros of the event study approach is the fact that other relevant information reflected in the security prices do not distort the results and the measured association between the tested variables can be attributed solely to the change in the accounting

earnings. However, small windows result in the fact that the effect of the post-announcement drift is excluded. Post-earnings-announcement drift occurs when realized earnings are better (worse) than expected and cumulative abnormal positive (negative) returns will exist on average for a short-period of time. Reasons for such an anomaly could be e.g. the costs of acquiring and processing information or transaction costs [Ball (1992)]. In Finland, Booth, et al. (1996) find evidence of post-earnings-announcement drift and state that it appears to be stronger for negative than for positive earnings surprises. Event studies can also suffer from confounding information, which is prone to arrive contemporaneously with earnings announcements. Management may try to mitigate the effect of a poor earnings announcement by simultaneously revealing plans for expansion or strategy changes and this will be reflected in the security returns making the ERC not only a pure measure of earnings information. Also to be noted is that only some of the potential information in reported earnings is conveyed to the market in the month of the annual earnings announcement, and price changes tend to anticipate earnings changes particularly for larger firms [Collins et al. (1987)].

Association studies test for a positive correlation between an accounting performance measure and stock returns over a relatively long contemporaneous period of time, e.g. one year. The assumption is that market agents learn about the earnings and valuation-relevant events throughout the research period and therefore a wider window is needed to measure the relation. The gathered information is used to measure whether accounting earnings are consistent with the underlying events and information set reflected in stock prices [Collins and Kothari (1989)]. Dumontier et al. (2002) stress that contrary to market reaction studies, association studies do not infer any causal connection between accounting figures and stock prices. They only posit that if accounting data are good summary measures of the events incorporated in security prices, they are value-relevant because their use might provide a value of the firm that is close to its market value. Similarly, Collins and Kothari (1989) summarize that association studies focus on whether the earnings determination process in a meaningful and timely way captures the valuation relevant events. The problem of this assumption then lies in the assumption that earnings truly are a good summary measure of value relevant events. It could be argued that in countries where the purpose of reported earnings numbers are tied to goals that would lead to them being highly different from objective summary measures of performance, e.g. traditionally taxation in Germany and Scandinavian countries could have a confounding effect, they should not correlate highly with capital market values.

The methodological approach in event and association studies is very similar, which is reflected in the fact that some researchers perform both event and association tests in their papers [e.g. Ball and

Brown (1968), Collins and Kothari (1989), Schadewitz (1996)]. Therefore, most of the time e.g. ERC papers reporting previous findings do not elaborate on the actual research method used or the length of the variable measurement periods. Results concerning such observations as the main ERC determinants (interest rate, risk, growth) have been detected to have a similar effect in both event studies and association studies and the different return window measurement approaches can be seen as complimentary in helping to explain the returns earnings relationship.

2.2 Market Efficiency – Interpretation Of Public Information

As discussed in the previous chapter, the basis for the returns earnings research was laid with the introduction of the concept of efficient capital markets. In an efficient stock market this means that prices fully reflect immediately and in an unbiased way all relevant information entering the market. Keane (1985) defines efficient markets having two separate aspects, the speed and the quality of a price adjustment to new information. Therefore, security prices are expected to reflect fully and instantly all relevant information available to the market when both of these conditions are fulfilled. Fama's (1970) classical division of market efficiency into three categories is very well known and differentiates on what type of information is regarded to be relevant when expecting that all prices fully reflect all relevant information:

(i) weak-form efficiency: prices fully reflect all information in prior price movements
(ii) semi strong-form efficiency: prices fully reflect all publicly available information
(iii) strong-form efficiency: prices fully reflect all relevant information in the market regardless of whether it is public or not

Fama (1991) later revised some of these definitions to take into account the current direction and advances made in research. Weak-form tests in this setting concentrate on the more general area of return predictability instead of how well past returns predict future returns. For example, forecasting returns with dividend yields or interest rates and looking for seasonalities in asset returns fall under the category. The semi strong-form efficiency in the new classification in defined as event-studies and strong-form tests are described as tests for private information.

Martikainen (1998) discusses the value of the whole set of information around investors in efficient markets. Following her illustration the value of an information set, $V(\eta)$, for an investor can be expressed through investor-specific utility functions, through different probabilities for some new

information to enter the market and through conditional probabilities of investors to take certain action when receiving the information.

$$V(\eta) = \sum_{m} q(m) \underset{a}{MAX} \sum_{e} p(e|m) U(a,e) - V(\eta_0) \qquad (2)$$

where

$q(m)$ = the marginal probability for investor to receive information m

$p(e|m)$ = the conditional probability of an event e, given information m

$U(a,e)$ = the utility for investor resulting from action a, given e occurs

$V(\eta_0)$ = the expected utility of the investor making a decision without information m

An investor will thus evaluate the surrounding information set, which can be described as a set of messages, and choose an action that will maximize his expected utility given the arriving message. Therefore, by weighing the expected utility of each optimal action by the probability of receiving the message, $q(m)$, the investor knows the expected utility of the entire set of information arriving to the market. The utility value for each individual investor will be affected by many different factors like the market structure and the state of nature defining the probability of each investor to be able to receive information. If the market structure or the economic environment changes, investors' utility functions are likely to change as well and this will affect the way they react to information (in the context of this paper, to earnings information). Also to be considered is the fact that investors' wealth will determine the extent to which they can react to new information as they can only take actions within their budget constraints.

The heterogeneity of agents in the markets is therefore a function of differences in preferences, differences in endowments and differences in information [Kandel and Pearson (1995)]. Concentrating merely on the last argument, some researchers [see e.g. Kandel and Pearson (1995), Rubinstein (1993), Harris and Raviv (1993)] have introduced models or empirical findings in support of individuals interpretation differences in relation to public information. The argument in these papers is based on investors actually receiving the same information and sharing the same prior beliefs but still differing in their reaction to the incoming information. In Kandel and Pearson (1995), the authors present evidence on the volume-return relation around earnings announcements and argue that it is inconsistent with most existing models in which agents have identical

interpretations about public announcements. They also use data on revisions of analysts' forecasts around earnings announcements to further point the inconsistency in identical interpretation.

Considering that agents in the market will differ in their beliefs as well as the possibilities and resources in acquiring information, the original Efficient Market Hypothesis in relation to price formation in the markets may be oversimplifying in practice. The work of Grossman and Stiglitz (1980) identifies a fundamental reason for information asymmetries between market participants, the cost of information, and uses it to construct a price equilibrium model. If we assume that prices reflect perfectly all available information in the markets, those who spent resources to obtain it would receive no compensation. Grossman and Stiglitz (1980) propose a model in which there is an equilibrium degree of disequilibrium: prices reflect the information of informed individuals but only partially, so that those who expend resources to obtain information do receive compensation. Thus the price system makes publicly available the information obtained by the informed investors to the uninformed. Other characteristics of the model include e.g.: the more individuals who are informed the more informative the price system, the higher the cost of information the smaller will be the equilibrium percentage of individuals who are informed, if the quality of the informed trader's information increases the price system becomes more informative and other things being equal markets will be thinner under those conditions in which the percentage of individuals who are informed is either near zero or near unity. Most importantly, even if the Efficient Market notion is not entirely accurate the price system will symmetrize the information structure among investors and the rational expectations equilibrium will be achieved. In the rational expectations equilibrium all individuals have rational expectations, i.e. they understand the functional relation between the equilibrium price and the joint signal. So all in all it can be summarized that the more information which is available about an enterprise and the greater the number of traders expending resources on information activities, the more informative prices become [see also Grossman (1976), Verrecchia (1979, 1982)] because prices more efficiently aggregate and transmit diverse information held by heterogeneous traders.

The concept of market efficiency in a world of heterogeneous individuals therefore builds on the concept of market participants acting as if everyone knows the relevant information used in pricing securities. Beaver (1981) notes that prior research finds adjustment of security prices to reported earnings taking place more quickly for stocks traded in high volume. More recently e.g. Bloomfield (1996) and Madhavan et al. (1997) have supplied evidence for trading impounding information into security prices. In Bloomfield (1996), the author uses data from a laboratory setting to determine

how trading volume helps market participants to learn from prices which then adjust as a result. Madhavan et al. (1997) try to answer the broad question of *"Why do security prices change?"* by studying the transaction level data of a sample of NYSE stocks in 1990. They also arrive at the conclusion of new public information and information learned through trading moving equity prices. Madhavan et al. (1997) also find evidence of systematic variation in their information asymmetry parameters across stocks and suggest that further research should try to define whether individual firm characteristics are important in explaining cross-sectional differences in price adjustment.

Further and deeper analysis of information efficiency in the markets and in particular the process of price adjustment are outside the scope of this study. There is, however, extensive accumulated evidence in the finance research which supports that public information is impounded into stock prices by trading and that this process makes the prices more informative. The former and the latter are important basic assumptions regarding this study as I intend to draw conclusions about the ability of prices to predict accounting earnings, which in turn are assumed to be a good proxy for the underlying set of information available, value relevant events, about an individual firm. In other words, the "availability" of this information set prior to the official announcement of yearly annual accounting earnings is measured from the prices, which are in turn assumed to be good summary measures of information.

2.2.1 Market Efficiency in Finland

Kallunki et al. (1997) review the accumulated empirical evidence about the Finnish stock market. The institutional characteristics of the Finnish markets have historically meant that like in other small markets clear signs of more inefficiency exists compared to more liquid trading places. This might be due to considerable information asymmetries between informed and uninformed traders, often less restrictive trading rules, and less developed institutions for investment analysis in small markets. Blevins and Schadewitz (1998) use interim earnings announcements of Helsinki Stock Exchange firms between 1986 and 1989 to show that there exists semi-strong form inefficiencies in HEX. Specifically, the price adjustment of share prices to unexpected interim earnings is found to be delayed by a statistically significant period. Studies that concentrate on the post-announcement drift in Finland [see e.g. Booth et al. (1996,1997), Heikkinen (2000)] have found similar evidence on semi-strong inefficiencies.

Booth et al. (1997b) studied the trades executed in the HEX between the time period 1993-1995. They found that most of the trades in the upstairs market (prearranged trades) were executed as in-house trades, the same broker acting in both sides of the transaction. Trades executed in the downstairs market, where trades are anonymously matched in the continuous trading, tended to have a higher information content and a higher price impact than upstairs trades, which were typically executed inside the downstairs market's inside spread. Booth et al. (1997b) therefore suggest that when investigating price discovery using small return intervals in HEX, a researcher should pay attention to the trading mechanism through which a trade has taken place. Additionally, they note that large trades seem to have a significantly larger permanent price effect, which effectively means that short term price adjustment in HSE may be distorted by the fact that the trading system cannot accommodate large trades without price pressure.

Kallunki et al. (1997) point out that there are several recent changes that might have or will probably affect the price behaviour of the Finnish stock market during the 1990s and beyond. Notably, the abolition of foreign ownership restrictions in 1993, the elimination of currency risk caused by the EMU membership (1998) and the general harmonization of accounting standards throughout Europe. Specifically, Kallunki et al. (1997) emphasize that the considerable increase in international ownership will presumably have a considerable strengthening effect on the relationship between Finnish and other major markets and consequently considerably change the behaviour of the Helsinki Stock Exchange. Vaihekoski (1997) notes that while the effect of the deregulation and liberalization process has had an effect on the stock market in Finland, it has also given room for financial innovations thus generally increasing the amount of alternative investment possibilities and instruments of risk management for domestic as well as foreign investors. As a result, the size of the financial sector has increased considerably and it has become more efficient.

2.3 Disclosure – Information Content Of Accounting Numbers

Firms communicate value relevant information to investors by providing corporate disclosure. This can be done in numerous ways e.g. through financial reports, management discussions, regulatory filings, conference calls, press releases, internet sites and a vast set of other means. Disclosure as a field of study is large and intriguing partly because it spans across three literatures, namely accounting, finance and economics. Verrecchia (2001) proposes dividing the existing disclosure research into three broad categories: association-based disclosure, discretionary-based disclosure and efficiency-based disclosure. Association-based studies are interested in the effects of exogenous

disclosure on the aggregate or cumulative change in investors' actions, primarily through the equilibrium prices and trading volume. Discretionary-based studies investigate how managers exercise discretion given the information they have available and efficiency-based papers try to find out which disclosure events are preferred in lack of prior knowledge of the information. Dye (2001) notes that the literature in disclosure has not yet matured enough to merit the status of a theory, especially in the case of accounting disclosures. Capital-market based empirical disclosure literature is reviewed extensively by e.g. Healy and Palepu (2001) and other papers related to the subject are e.g. Lambert (2001) and Dye (2001).

The most recent and relevant papers regarding my study try to characterize the link between price informativeness and disclosure. Fishman and Hagerty (1989) model how increased disclosure can lead to increased price efficiency and more efficient investment decisions. The logic behind their reasoning is that more efficient prices are more sensitive to the chosen investment level and therefore offer greater incentives to invest. Their key finding is that because of this incentive firms may actually have an incentive to disclose too much information and that mandatory disclosure only serves to aggravate the problem. Fishman and Hagerty (1989) argue that in this case, the benefits of additional disclosure outweigh the costs and the general public policy concern that firms on their own will spend less on disclosure than is socially optimal is put into an interesting light.

Lang and Lundholm (1996) investigate the association between disclosure practices, the number of analysts following a firm and the properties of their forecasts in the US. The informativeness of a firm's disclosure policy is derived from the *Report of the Financial Analysts Federation Corporate Income Committee* (FAF Report 1985-1989), in which analysts evaluate the complete range of a firm's disclosure by a score in each of the three following categories: annual published information, other published information and investor relation. Lang and Lundholm (1996) suggest that firms can attract analysts, improve the accuracy of market expectations, reduce information asymmetries and limit market surprises by adopting more forthcoming disclosure practices. Gelb and Zarowin (2002) note that while the results in Lang and Lundholm (1996) are interesting, the use of analyst forecast as proxy might provide evidence of firms "managing" their analyst relationships better (i.e. whisper numbers) rather than prices actually being more informative.

Both Fishman and Hagerty (1989) and Lang and Lundholm (1996) can be seen as studies that contribute to the old argument that firms essentially strive for increased disclosure to lower their cost of capital. Leuz and Verrecchia (2000) study German firms that have switched their disclosure

environment by moving to an international reporting regime (IAS/US GAAP) from a German one and thus bypass the problem of generally used US samples already having a relatively rich disclosure environment. Leuz and Verrechia (2000) show that a commitment to an increased level of disclosure will lower the information asymmetry component of the firm's cost of capital, proxied by bid-ask spreads and share turnover. Specifically, they argue that a commitment to higher disclosure rather than a specific adopted reporting regime (IAS/US GAAP) will help the firms to extract economic benefits.

In Gelb and Zarowin (2002) the authors examine the association between the level of voluntary corporate disclosure and the informativeness of stock prices. Corporate disclosure, similarly to Lang and Lundholm (1996), is measured using the annual Association for Investment Management Research – Financial Analysts Federation (AIMR-FAF) corporate disclosure ratings. The informativeness of stock prices is inferred from the association between current stock returns and future earnings changes. More informative stock price changes contain more information about future earnings changes. Gelb and Zarowin (2002) find that consistent with their hypothesis greater disclosure is associated with greater price informativeness (i.e. higher future ERC) and therefore greater disclosure also provides information benefits to investors. The basic idea and research design in the Gelb and Zarowin (2002) study lies on the returns earnings lead-lag relation and is thus relevant to this paper.

Instead of covering the disclosure literature more broadly, I will move on to the specific characteristics of accounting disclosure and accounting earnings in particular, since they form the central part of this study. I believe that concerning disclosure in general and this paper it is enough to understand that there is a link between the amount of disclosure and the informativeness of stock prices and that it has been proven empirically.

2.3.1 Accounting Disclosure

In an accounting setting the central question is whether security markets behave efficiently with respect to accounting information. Accounting standards and practices in developed countries generally use the "recognition principle", including the Revenue Realization and Expense Matching principles, as a basis for the financial reporting system. In essence, "accounting income" lags "economic income" since the latter incorporates changes in expectations of the present values of

future cash-flows where the former incorporates such changes in accounting income gradually over time. Ball et al. (2000) note that this feature of accounting income arises because there is demand for an income variable with properties additional to timeliness. Stated differently, information asymmetry between managers and users creates demand for an income variable that is observable independently of managers. Therefore, accounting income only incorporates the subset of available value-relevant information that is independently observable, whereas economic income incorporates information that is not independent of managers, such as plans and forecasts. In other words, accounting income does not attempt to predict future cash-flows in the same way as economic income. The result is that accounting income will be a complex moving average of economic income. Another feature of accounting income is conservatism [Ball et al. (2000), Basu (1997)]. A popular example is the "lover of cost or market value" inventory rule, which incorporates inventory losses more quickly in income than gains. In the case of long-term assets it can effectively mean that increase in income is added at the point of the actual realization of the cash-flow (in the future) but a predicted decrease in cash-flow is incorporated into income immediately as a write-off.

In relation to accounting income, Ball et al. (2000) also find evidence that differences in demand for accounting income in different institutional contexts cause its properties to vary internationally. Their approach divides countries to those using common law, which originated in Britain and eventually spread to its colonies, and those using code-law (e.g. France, Germany and Japan). In common law countries the "shareholder" governance model is typical and the desirable properties of accounting income are determined primarily in the disclosure market. This leads to income exhibiting greater timeliness (compared to code law countries) mostly through faster recognition of losses. On the other hand, in code law countries the demand for accounting income is more influenced by the payout preferences of agents for labour, capital and government and less by the demand for public disclosure. The representatives of these "stakeholders" are involved in the corporate governance and their insider communication solves some of the information asymmetry between managers and "stakeholders". For example in Finland banks were almost the only source of capital for firms until the late 1980's for various reasons and thus were and still are a major player in corporate governance [Ihamuotila (1994)]. Although the common law vs. code law separation is only descriptive and both groups are not expected to be totally homogenous, it offers a concept of how the political, economical and social environment has helped to shape the interaction between economic income and accounting income in different countries.

Similar viewpoint in respect to the information content of accounting information in different countries was presented in the study be Jacobson and Aaker (1993). They argued and find evidence for the fact that investors in the United States value short-term financial gains over long-term profitability compared to Japanese investors because of greater information asymmetries between managers and outsiders. In other words, in the US investors have less capability of credibly assessing the companies possibilities for long-term performance, i.e. they can not differentiate between bad and good managers, and this drives managers to concentrate on improving short-term results. Another factor that should be considered is that managers wages, bonuses and option programs are often tied to security prices in the US and if (as assumed) the stock market uses current results as indicatory of future profitability, it gives an incentive to boost earnings. In Japan, investors typically have closer ties to the companies and can put lesser emphases on short-term profits in assessing long-term gains. These investors, because of their business links, have considerable strategic information about the performance and plans of their associated firms. Jacobson and Aaker (1993) in their conclusions offer lessening the restrictions on insider trading and bank ownership of securities to improve the long-term focus of US firms although noting the potentially deleterious effects of these actions.

2.3.2 Finnish Accounting Legislation – History and Features

The Finnish GAAP have historically been somewhat different compared to common-law or even other code-law countries [Kettunen (1993)]. Their roots lie in the German accounting tradition of early 1900's since the first researchers in the field in Finland kept close contacts to German scholars. The basis for the modern financial accounting practice can be seen to have been laid following the transition of the Finnish society from an agricultural one to a modern industrial society in the 1960's and early 1970's. The renewed financial accounting legislation (1973) and tax legislation were based on the theoretical ideas of Professor Matti Saario, who commenced the development of his ideas in his dissertation "Realization Principle and Depreciation of Fixed Assets" in 1945. An important feature of the new legislation was its very wide discretion given to managers in respect to depreciation rules, inventory rules and rules on how to divide wages between years, which essentially meant that companies that were growing and investing did not have to pay any taxes. This was essentially the case since financial accounting reports were the base of taxation and the Government's intention was to spur economic growth by tying financial accounting and taxation close together, an approach that is still a feature of Finnish accounting practices.

Coming into the 1980's pressure begin to mount in Finland in relation to harmonizing the accounting legislation to International Accounting Standards. Globalisation of business activities and the harmonization in Europe set new demands on financial reporting. Accounting professionals argued that Finnish firms were disadvantaged in an international setting as they had to prepare a new set of financial reports every time they entered the international market. Kinnunen et al. (2000) studied the firms that published dual financial reports on the Helsinki Stock Exchange after the mid 1980's to determine whether the earnings produced by different standards had different value to domestic and foreign investors. The approach could be taken since at the time there were still foreign ownership restrictions[1] on Finnish shares and Hietala (1989) [see also Nummelin and Vaihekoski (2002) for similar results] had proven that foreign investors effectively determine the prices of 'unrestricted shares' and domestic investors the prices of 'restricted shares'. The results of Kinnunen et al. (2000) were that for foreign (domestic) investors IAS (Finnish GAAP) earnings had incremental information content over Finnish GAAP (IAS) earnings. This was further proof of financial information produced by Finnish GAAP differing from international practices and Finnish internationally orientated companies having a point in preparing dual financial reports.

During the 1980's the Government started to shift its focus from regulating the behaviour of the firms to concentrating on tax income. Capital markets were also in the middle of a liberalization process [Booth et al. (1996)], which meant that equity investors were becoming an increasingly important target group for financial reporting as the bank-driven financial system was gradually changing. All of this meant that the introduction of a new accounting legislation in 1992 was a clear turning-point in Finnish financial accounting. The importance was now laid more clearly on informing all of the stakeholders of the firm: owners, creditors, investors and the society at large. As Kettunen (1993) notes, the goal was to make Finnish financial reports more comparable to those reported by companies in other countries by incorporating more EC legislation and ultimately increasing the informativeness of financial reports.

As a result of the changes made to the financial reporting and the continuing effect of European Union in harmonizing IAS practices, Finnish GAAP are increasingly approaching IAS. However, a

[1] Foreign ownership restrictions were put in place to protect strategically important industries [Kasanen et al. (2000)], changes were needed in 1993 because Finland applied for EU membership

recent survey[2] by the biggest global accounting firms ranks Finland 44th among 53 developed countries in terms of conformity to IAS practices and notes that there are still several inconsistencies between national rules and IAS that could lead to differences in terms of published accounting information for many enterprises. Therefore, some of the differences that have branded the Finnish financial reporting practice internationally through the years are still likely to exist, notably: taxes are closely tied to earnings and opportunities for earnings management are extensive and visible [Schadewitz and Kanto (2002)].

2.4 Prior Returns Earnings Research: ERC Determinants

The underlying logic in studies covering return earnings regressions is that a message is said to convey information if it causes a change in the receiver's probability distribution of the concerned random variable. Therefore, a change in the probability distribution (beliefs) will trigger an action and the information that attributed to the decision will be considered useful. A revision in the dependent variable (stock prices) would then provide evidence on the usefulness of the independent variable (earnings) and the greater the explanatory power of earnings to returns the greater the informational content of earnings would be. While ERC studies offer one viewpoint to the usefulness of earnings it should be noted, though, that the significance of the association between returns and earnings does not provide a complete measure on earnings usefulness. In various capital market contexts, such as corporate bankruptcy, prediction of a stocks' systematic risk and bond ratings, earnings have been found to be useful [Foster (1986)].

Despite a large amount of research the explanatory power (R^2) of the ERC model has been found to be quite weak in both the event and association study setting (under 10% in a one year contemporaneous regression). Lev (1989) in his extensive review of ERC research in the late 1980s summarized some of the factors that might contribute to the reported findings. He notes that it is possible that a misspecification of the model might explain the weak association between earnings and returns or that investor irrationality, "noise trading", is the cause of the problems in the model. However, the most probable explanation is the low quality of accounting information and earnings in the eyes of investors. Hence, it would seem logical to concentrate on improving the quality of reported accounting numbers rather than on methodological issues. Especial importance should be

[2] GAAP 2000: A Survey of National Accounting Rules in 53 Countries: Arthur Andersen, BDO, Deloitte Touche Tohmatsu, Ernst & Young International, Grant Thornton, KPMG and PricawaterhouseCoopers.

given to researching the actual use of accounting information by investors and general accounting measurement.

Despite the apparent problems in finding a strong empirical link between returns and earnings researchers have continued to look for ways of bettering the explanatory power of ERC regressions. The following section provides insights into the most common research findings that have helped practitioners to understand why ERC studies might find an unexpectedly weak empirical link between returns and earnings even though the theoretical linkage between the two variables can be strongly proven (see Chapter 4 for details).

2.4.1 Economic Determinants of ERCs

Persistence – Transitory Components

The role of earnings persistence in explaining ERCs has been acknowledged in various studies [e.g. Kormendi and Lipe (1987) and Easton and Zmijewski (1989)]. The logic is that while valuing securities investors will take into consideration that only a part of the earnings will persist in the long-term and use this information in forming their cash-flow expectations. Ramakrishnan and Thomas (1995) define that "permanent earnings shocks are those that will cause all future earnings to change". Empirically speaking then the transitory part of the earnings innovation will be reflected in the security price only by a multiplier of 1 instead of the ERC depending on the valuation link (see Chapter 4 for a more detailed discussion). So one of the underlying reasons for the economically weak returns earnings relation could be that the reported accounting earnings are not permanent by nature and transitory (temporary) shocks affect only the earnings of the current period. Several papers [e.g. Beaver et al. (1987) and Ohlson (1990)] have detected that earnings do include transitory components that are either value-irrelevant or have a low valuation impact. Perhaps the most common explanation for transitory earnings is that earnings are managed through discretionary accruals. This could be the result of a one-time business activity such as an asset sale. Basu (1997) stresses that because of information asymmetry between managers and investors there is a demand and supply for conservative accounting numbers. Therefore, earnings are likely to reflect bad news more quickly than good news. Hayn (1995) has also proved that losses can been interpreted as transitory or negative earnings and they are not expected to continue indefinitely since shareholders have a put-option on the assets of the firm. Hence they will liquidate the firm

rather than suffer continued losses and in essence losses will distort the observed returns earnings relation.

In empirical returns earnings studies researchers have often relied on the assumption of earnings following a random walk and thus being completely permanent.[3] This is because it has been proven that the earnings time-series can be well approximated as a random-walk and the assumption makes it theoretically possible to model the link between earnings and security returns through valuation models. This issue will be further discussed later on (Chapter 4) in the paper. However, some studies which effectively build on the work done by Beaver et al. (1980), Miller and Rock (1985) and Kormendi and Lipe (1987), try to estimate the time-series properties of each individual firm's earnings and then use this information in estimating the market reaction to earnings innovations – the magnitude of return reactions to earnings innovations should be positively related to the measure of persistence. The estimation of persistence is done by assuming that earnings follow different ARIMA-processes, which require a historical time-series of earnings to be gathered in order to execute the analysis. This will effectively rule out their use in security markets with a relatively short history and relatively few traded shares, e.g. Donnelly (2002) requires historical time-series of earnings from 17 successive years in his paper. A summary of earnings persistence factors under different ARIMA earnings processes can be found in Collins and Kothari (1989). They also note some short-fallings of using ARIMA models, notably the fact that the estimates cannot distinguish between correlation in successive earnings numbers brought about by mere expansion and economic growth and that they cannot pick up trends since the ARIMA-models presume parameter stability. Still, the cited papers find evidence that the measure of persistence explains some of the return reactions to earnings innovations. Earnings persistence thus explains part of the cross-sectional variation in ERCs.

Risk

The size of the ERC, return reaction to earnings innovations, will depend on how investors will change their expectations about future cash-flows and the present value of these cash-flows will in turn be affected by the discount rate used in the actual process. Risk as a factor to explain the ERC is understood here as the systematic component of the equity cash flows' volatility. It is also often called the covariance component or the non-diversifiable factor in a security's volatility. Single- or

[3] This is the case especially in association studies, event studies have increasingly used analysts' expectations in the unexpected earnings component due to them becoming more easily attainable.

multi-beta versions of the CAPM imply that the equity discount rate increases in the equity cash-flows' systematic risk [Fama and French (1993)]. Therefore greater risk implies a larger discount rate, which reduces the discounted present values of the revisions in expected future earnings [Easton and Zmijewski (1989)].

Most cited empirical proof of systematic risk being a determinant of the ERC include Collins and Kothari (1989) who use common stock betas estimated from monthly returns as a proxy for the riskiness of earnings.

Growth

Growth opportunities can be expected to influence ERCs. Collins and Kothari (1989) argue that this is since a change in earnings causes a large change in cash flow expectations if the firm has high growth opportunities. Various researchers have used the market-to-book (MTB) ratio to measure the validity of the hypothesis. The MTB ratio can be regarded as a good proxy for growth opportunities since the difference between market and book values of equity roughly represents the value of investment opportunities faced by the firm. In essence, the market is willing to pay more than the book value of equity for those firms that have large expected cash flows due to successful investments.

Fama and French (1995) found that for all NYSE firms between 1963-1992 there was a clear difference in the earnings streams of different company groups formed based on the MTB –ratio. As expected, firms with a high MTB –ratio were associated with long-term profitability and vice versa. Therefore, one way of interpreting the MTB –ratio could also be to consider it as a proxy for earnings persistence: firms with high MTB ratios are more likely to maintain their earnings and thus have bigger ERCs. Martikainen (1998) is an example of a paper that empirically demonstrates that there is an observable relationship between growth opportunities and ERCs. She uses a sample of NYSE firms between 1975-1990 to prove that the exclusion of loss observations increases the ERCs most significantly among firms that have the greatest growth opportunities. This is the case since the valuation impact of earnings is high in the group of firms with high growth opportunities and the value relevance of the excluded accounting losses is low.

Interest Rate

One of the most obvious economic determinants of the ERC is the risk-free interest rate. In Collins and Kothari (1989), the authors note that the ERC is negatively related to the securities' future expected discount rates. The discount rate is made up of the risk free interest rate, the markets' risk premium and the firms' CAPM beta risk. The Sharpe-Lintner model can be used as an illustration:

$$E(R_{it}) = R_{ft} + \beta_{it}[E(R_{mt}) - R_{ft}] \tag{3}$$

where $E(R_{it})$ is the expected rate of return on security i at time point t, R_{ft} is the risk free interest rate, $E(R_{mt})$ is the market risk premium and β_{it} is the securities beta respectively. So if the risk free rate of interests rises, then ceteris paribus the discounted present values of the revisions in expectations of future earnings innovations falls, inducing a negative temporal association between interest rate levels and ERCs. It should be noted that revisions in risk free interest rates and the markets' premium will have effect on all ERCs, the only component in the discount rate that varies cross-sectionally is the systematic risk (beta).

The argument that the risk free interest rate is a temporal determinant of ERC magnitude ignores the possibility of an inflation effect. If we assume that changes in interest rates are only changes in expected inflation rates and that firms pass on the changes in inflation to customers in the form of higher prices, there will not be any relation between interest rate changes and ERCs [Kothari (2001)]. So basically, the negative relation between interest rates and ERC implicitly assumes either interest rate changes covary positively with changes in real interest rates or inflation negatively impacts stock prices because of unanticipated inflation's negative effects on economic activity.

2.4.2 Other Factors Affecting The Size of The ERC

Johnson (1999) studied the effect of "normal" fluctuation in business conditions on ERCs and found evidence of larger ERCs in expansionary periods. She argues that because it is easier to capitalise on investment opportunities in expansion earnings will be more persistent during expansionary periods than recessions. Since earnings persistence is linked to the revisions made in investors' cash-flow expectations resulting from a change in earnings, time-variation in persistence

will lead to time-variation in ERCs. As a result, ERCs are positively related with the rate of growth in economic activity and the level of economic activity.

Lev and Thiagarajan (1993) demonstrate the importance of applying a contextual capital market analysis by claiming that the empirical relationship between returns and earnings is notably improved after controlling for macroeconomic variables. For example, high GNP is associated with affluent economy and investors might therefore expect high share returns and high ERCs. Lev and Thiagarajan (1993) also build a "quality of earnings" score based on the hypothesized significant accounting fundamentals used by investors to evaluate the persistence of a firm's earnings stream and use it to evaluate ERCs and future earnings growth. Identification of value-relevant financial statement fundamentals is guided by analysts' descriptions and includes such measures as a disproportionate increase in inventory, a disproportionate increase in accounts receivables or a decrease in capital expenditure and R&D.

Chaney and Jeter (1992) show that in a long-window (12-,15- and 24-months) setting firm size is positively related to the magnitude of the ERC. Their interpretation of the results are that the broader set of information available about large firms enables market participants to interpret the information in financial statements more completely and to estimate more accurately future cash flows, leading to a decreased level of system uncertainty. The finding is consistent with earlier evidence by e.g. Kross and Schroder (1989) on the negative relationship between size and the magnitude of short-window ERCs. As investor will have less information available about smaller firms throughout the financial year the reaction to the actual release of annual earnings information will be larger because it contains more new information.

Dhaliwal and Reynolds (1994) argue that a firm's ERC is inversely related to its default risk. Their reasoning is based on higher levels of default risk being associated with market's perception of lower persistence in any unexpected element of earnings. By using bond ratings and leverage levels as surrogate measures of default risk Dhaliwal and Reynolds (1994) obtained evidence backing the theory in the US market. However, Kim et al. (2002) studying US industrial firms between 1984-1993 and using changes in debt as a proxy for changes in default risk find contradicting results to that predicted by the theory about the relation between the ERC magnitude and default risk. They attribute the surprising findings to e.g. their proxy poorly mitigating default risk, bull market during the research period and low R^2 of the estimated regressions.

2.4.3 ERC Determinants in Finland – Prior Research

The studies concerning the association of earnings and security returns in Finland were quite limited until the 1990s probably mostly due to the lack of proper research data. However, as Martikainen et al. (1990) note, especially in thinly traded markets financial reports might offer valuable information to investors because risk estimation based on historical returns is very difficult due to infrequent trading.

Korhonen (1975) was one of the first to study the association between earnings and security returns in Finland. By using weekly stock price data from the period 1960 to 1971 he reported findings similar to those made by Ball and Brown (1968). Additionally, Korhonen (1975) found evidence of the lead-lag effect in the form of information content of earnings being reflected in the stock prices before accounting numbers were released. The so called Arbitrage Pricing model by Ross (1976) was tested by Martikainen and Yli-Olli (1990) on the Finnish stock market and strong long-term association between stock returns and financial ratios were found.

More extensive studies on the characteristics of the ERCs on the Finnish market have been made since the beginning of the 1990's. Martikainen et al. (1990) tested the effect of four different depreciation methods on the earnings-returns relationships between 1975-1986 arguing that investors should pay attention to which depreciation method they use in adjusting corporate earnings in order to make their portfolio decisions. The reasoning being that the characteristics of the Finnish accounting standards courage companies to reduce taxes by using the accelerated tax-based method of depreciation instead of more theoretically preferable options such as the realization method. However, Martikainen et al. (1990) find that the connection between the tax-based method of depreciation earnings (reported earnings) and stock returns were highest whilst annuity depreciation based earnings had the smallest explanatory power. They could not differentiate between the straight-line depreciation method and the realization depreciation method. The results could be partly explained by the fact that at the time Finnish analysts published purely tax-based earnings ratios in their company analyses. It could also imply that investors simply use reported earnings instead of adjusted earnings for some reason.

Martikainen and Ankelo (1990) studied macroeconomic effects on the association between corporate earnings and stock returns by using the firms listed in the Helsinki Stock Exchange in period 1975-1985. They found evidence of intertemporal variation of earnings coefficients and that

a positive relation existed between market returns and ERCs. Martikainen and Ankelo (1990) also discovered evidence for a negative connection between earnings response coefficients and interest rates, a phenomena earlier cited in the US stock market by Collins and Kothari (1989). No support was found for GNP or inflation rates being significant intertemporal determinants of earnings response coefficients in the Finnish market.

Martikainen et al. (1997) found support for the evidence that presence of losses reduces the estimated return-earnings relation also in Finland. The earlier such findings were made by e.g. Hayn (1995) with US evidence. Losses were more frequent in Finland for the earnings prepared according to the guidelines provided by the Finnish Committee for Corporate Analysis (COC), which meant that unadjusted disclosed earnings resulted in a stronger association between earnings and stock returns.

The information content of accrual earnings, cash flows and cash dividends in the Finnish stock market was reviewed by Martikainen et al. (1993). They found results indicating that the market typically reacted to the same direction as the sign of the unexpected earnings or cash-dividends. Martikainen et al. (1993) also note that their results imply semi-strong form inefficiencies in the Finnish market, which may be a result of serious problems in risk estimation.

3. PRICES LEADING EARNINGS – THE LEAD-LAG STRUCTURE OF ERCs

The previous section lists some of the ERC research topics that are commonly used in the literature to explain the nature of the relationship between returns and earnings. Next, the concept of prices leading earnings, central to this study, will be presented.

The low contemporaneous relation between returns and accounting earnings could be explained by the fact that many of the alternative sources of value-relevant information are more timely than accounting earnings. Remember that the properties of accounting earnings, namely timeliness and conservatism, arise from demands of various agents within the society and consequently will lead to security prices impounding a richer information set than that in the past time series of earnings. Consider for example a situation where a firm has made a breakthrough in product technology, gets tax relieves from the government or suffers a strike. Investors will accordingly make adjustments to their expectations about future cash-flows that will be reflected in the security market but accounting earnings will impound the events with a lag – depending on the accounting standards and in some cases the choices made by the management (accounting practices). Therefore, if the objective of association studies is to capture all valuation changes associated with the events reflected in the current period's reported earnings measure, it may be necessary to initiate the cumulation of security returns prior to the beginning of the current accounting period. Figure 1 illustrates how in empirical research the return window is stretched to include leading period returns and how overlapping returns are used when estimating a large pool of regressions.

Beaver et al. (1980) were the first to examine the empirical relationship between price changes and earnings within the context of assumptions regarding valuation and uncovered that earnings exhibit a lagged response to the information reflected in prices, i.e. the prior year's return has explanatory power for current earnings. Hence the motivation for the use of term, *the information content of security prices*. Beaver et al. (1980) also point out the possible circularity of analysts' earnings forecast evaluation with respect to ability to forecast future periods earnings if analysts themselves are acting as if they use current security prices to extract information about future earnings.

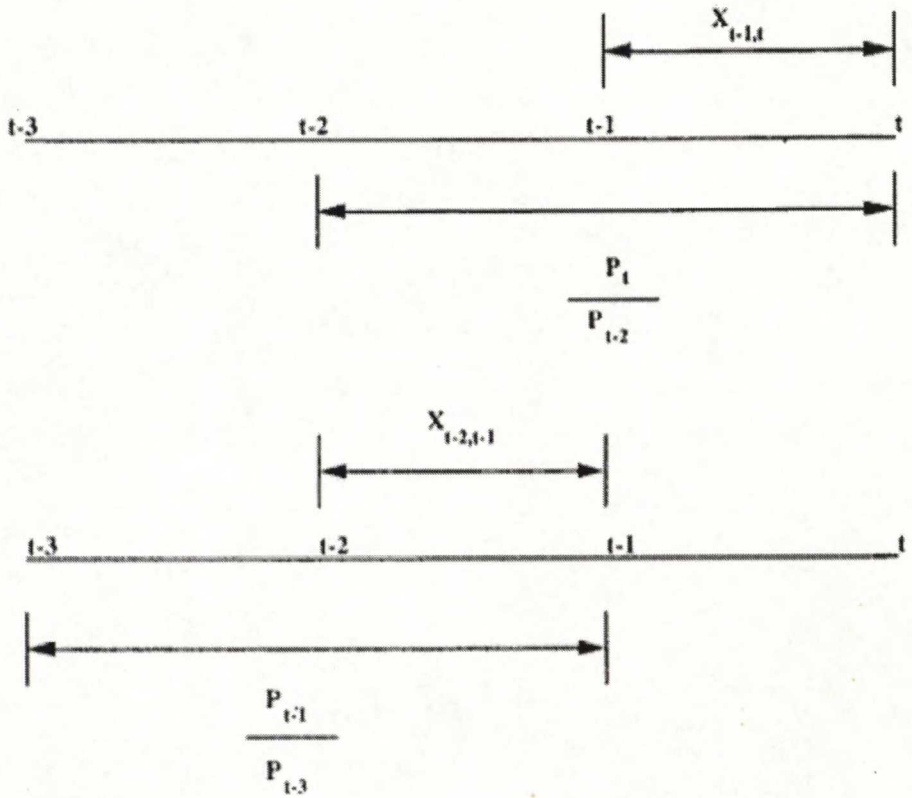

Figure 1: Example of earnings and returns measurement in lead-lag price earnings regressions. Return measurement interval consists of the contemporaneous and one leading year. Return observations are overlapping. [Kothari and Sloan (1992)]

The work of Beaver et al. (1980) was followed by several papers, which started to consider the effect of the prices leading earnings phenomenon in an ERC setting. For example Collins and Kothari (1989) point out the importance of taking into account the lead-lag structure between earnings and returns while researching the returns-earnings association. They find that returns measured over a 12-month period seriously understate the degree of association between price changes and earnings changes for a Compustat sample of NYSE firms between 1968-1982. A typical association study return cumulation period, April of year (t) to April of year (t+1), results in an adjusted R^2 of 2,41%, while the maximum R^2 of 10,94% is attained when a 15-month cumulation period starting from August of year (t-1) is used.

Kothari and Sloan (1992) examine ERCs for a large sample of Compustat firms between 1950-1988 and include up to three leading year's returns to more fully exploit the information in prices with respect to future earnings. The average ERC increases from 3,1 when annual, contemporaneous

price-earnings regressions are estimated, to 6,0 when returns from the three previous years are included in the dependent variable. Kothari and Sloan (1992) note that this would imply capital markets viewing earnings changes to be largely permanent, which is consistent with the annual earnings' time-series properties. They also estimate price-earnings regressions using returns and earnings measured over a long contemporaneous window. The approach improves the ERCs compared to a normal annual setting but is not as effective as including leading-period returns probably since returns measured over long intervals do not completely incorporate earnings anticipation. Similar results are obtained by Warfield and Wild (1992), who also note that the cross-sectional differences in accounting recognition criteria is important in explaining differences in explanatory power over contemporaneous regressions of earnings on returns.

Although most of the empirical studies in the field concentrate on the US market because of the availability of good and extensive research data there is also evidence from other countries that confirm the existence of the prices leading earnings phenomenon. Donnelly and Walker (1995) studied UK companies that had earnings and security prices available for the sample period 1972-1989 and found that most of the bias due to prices leading earnings is mitigated by allowing for prices leading earnings by one period. This result, compared to Kothari and Sloan (1992), would suggest that the extent to which prices lead earnings in the UK is less than that reported in the US. However, Donnelly and Walker (1995) do not try to specify the reason for the difference, they only state that in general the amount of price anticipation may be greater today than it was in the beginning of the sample period due to increase in both mandatory and voluntary level of disclosure. Donnelly and Walker (1995) also elaborate on the appropriate proxy for earnings in the regression considering the time-series properties of earnings. Most importantly, they find evidence that the improvements in ERC estimates generated by using leading returns are also associated with earnings persistence.

In Finland, Kallunki and Martikainen (1997) studied to what extent prices lead earnings in the period 1988-1993 using a regression with monthly returns and reported earnings (net profit in the income statement). Their methodology followed that used by Collins and Kothari (1989) and included the comparison of two sub periods (1988-1990, 1991-1993) to investigate the effect of a sever recession on the ERC magnitudes. After controlling for losses the results show that for the first sub period the highest explanatory power is obtained when the cumulation period of 24 months starting from September in year (t-1) and ending in August in year (t+1) is used and the corresponding holding period for years 1991-1993 is the 23-month period starting from April in

year (t-1) and ending in February (t+1) [the R^2s being approximately 32% and 34% in the periods respectively]. In essence, the results indicate that the extent to which prices lead earnings is increasing in Finland. Kallunki and Martikainen (1997) argue that this may be a result of an increase in the information efficiency caused by the development of the infrastructure of the Finnish stock market. Further evidence on the issue is needed, however.

To summarize, research evidence from the last 20 years gives support for the prices leading earnings theory. A key issue in empirical work, as in most other papers covering ERCs, is that there is no clear consensus on what methodology should be used. Fortunately this does not present a surmountable obstacle for prices leading earnings research since the results support the phenomenon under all the major methods used: see e.g. Beaver et al. (1987) for a reverse regression and Kothari (1992) for a comparison of "earnings change" and "earnings levels" as a proxy in a regression. The issue of methodology in ERC regressions when prices lead earnings is covered in Chapter 4.

3.1 Information Environment as a Determinant of Cross-Sectional Differences in Price Anticipation of Earnings

As presented in the previous chapter, empirical evidence supports prices leading earnings in capital markets. Donnelly (1998) emphasizes that two conditions must be fulfilled for this to happen: accounting recognition lags value-relevant events and the market becomes aware of these events before accounting earnings are released. The former condition was covered earlier in the paper and it was discussed that it is closely tied to features of accounting information such as timeliness and conservatism. The latter condition is related to the information environment of a firm, also defined as "corporate transparency" [Bushman et al. (2003)]. A firm's information environment can be characterized as the market's demand for and a firm's supply of value-relevant information. In other words, the more information that is available about a firm and the greater the number of investors expending resources on information activities, the more informative prices become [Grossman and Stiglitz (1980), Collins et al. (1987)]. The assumption in this study is that the price anticipation of earnings will increase with the richness of the information set reflected in security prices [Donnelly (1998)]. The logic behind the assumption stems from the efficiency of the price determination process, which was covered in Chapter 2. I will next go through the determinants that can be hypothesized to be related to a firm's information environment, and hence to cross-sectional

differences in the lead-lag in a returns earnings regression, and will be tested in the empirical part of this study.

3.1.1 Firm Size

The price anticipation of earnings was defined to be determined by a firm's information environment. Some previous research suggest that the amount of information available for investors about large firms is greater relative to that available about small firms other things being equal. Atiase (1985), using his differential information hypothesis [Atiase (1980)], argues that information production and dissemination by private parties for the purpose of identifying mispriced securities is an increasing function of firm size. This will lead to (i) security prices of large firms anticipating accounting earnings earlier that that of small firms and (ii) the cumulative abnormal returns of small firms exceeding those of large firms for a given level of "unexpected" earnings.

The reasoning behind the differential information hypothesis is based on the interplay between marginal trading profits and marginal search costs. Consider that investors could buy or sell all outstanding shares of a firm at the pre disclosure price and cover their positions at the predicted post disclosure value. Assuming costless information trading profits would then vary in strict proportion to the market value of the given firm. However, considering the more realistic assumption that the information search process is costly the marginal search costs will tend to off-set the effect of marginal trading profits. How to assess the marginal search costs relative to trading profits then becomes the key question. It can be argued that larger listed firms are generally more complex and that their structures and operations differ drastically from small public firms, which would increase search costs in tandem with size. On the other hand, certain initiation costs decrease with company size since large firms often supplement more extensive voluntary financial reporting, maintain investor relation with greater care and are frequently covered in the financial press. E.g. Bushman (1989) shows that analyst following is a positive function of size, affecting firms' information environments. Atiase (1980) argues that post-search equilibrium prices of large firms are more informative than those of small firms because the marginal net profit (trading profit minus search cost) from private search is an increasing function of firm size.

Empirical support for Atiase's arguments are offered in the studies by Atiase (1985) and Freeman (1987) for the definitions (i) and (ii) cited earlier, respectively. Collins et al. (1987) build on the

work by Beaver et al. (1980) to investigate the information content of prices in respect to future earnings by partitioning firms according to size. They emphasize that their findings, similar to those of Atiase (1980) and Freeman (1987), have important methodological implications for studies that try to measure the degree of association between security returns and accounting earnings. Specifically, prices changes tend to lead accounting earnings particularly for large firms and researchers may want to start the cumulation of returns prior to the period for which the earnings are measured. Outside the US, Donnelly and Walker (1995) researched the amount of which firm size is related to price anticipation of earnings in the UK and found evidence of market value having a significance especially for price anticipation in the year prior to the earnings announcement. Donnelly (1998) obtained results of similar magnitude, although pointing out that more precise proxies for the information environment may produce better results.

H1: The price anticipation of earnings is positively related to firm size proxied by market value.

3.1.2 Trading Volume

The arguments of Atiase (1980) and Freeman (1987) covered in relation to firm size and the information environment of a firm can be expanded to the breath of trading in a security. It can be argued that the marginal benefit from acquiring additional information should increase with trading volume assuming search costs do not increase in tandem. The advantage of trading can be then more fully exploited before all privately produced information is fully reflected in security prices. Additionally, informed trading can also be identified more quickly in thinly traded stocks [Grossman and Stiglitz (1980), Easley and O'Hara (1992)]. Therefore, there will be more information collected about firms whose shares are widely traded and there is a smaller probability that their securities are mispriced.

Here it is important to differentiate between two separate factors affecting the price movements of a firm's security. There is a large number of papers in the finance research field that try to explain how e.g. large trades by informed traders are tied to spreads and depth of trading or the increase of uninformed traders will introduce noise and delay price adjustments [Koski and Michaely (2000)]. The speed of price adjustment is tied to the market microstructure and the proportion of informed/uninformed traders acting in the markets [Easley and O'Hara (1992), Easley and O'Hara

(1992b)]. As it is these studies are interested in the specific price discovery process on a market, which can be viewed as a highly complicated process outside the scope of this paper.

The hypothesis in this paper is that the breath of trading proxy for the scope of information collecting activity as well as availability and hence the richness of the information environment of an individual firm. As well as relying on the theoretical arguments proposed by Atiase (1980) and Freeman (1987), the hypothesis is supported by empirical work in e.g. Bessembinder et al. (1996) and Mitchell and Mulherin (1994). In the latter study, the authors assess the notion that a greater number of news announcements maps into more information facing investors and thereby inducing greater trading volume and price variability. They use the number of news stories reported daily by Dow Jones & Company as a proxy in the empirical design and find that it is directly correlated with stock market activity. Bessembinder et al. (1996) build on the models by Kyle (1985), who suggests that information is incorporated in prices through agents' trades. In Bessembinder et. al (1996) the authors, based on Ross (1989), use the absolute deviations of individual firm returns from market-model returns as measures of firm-specific information flows and compare it to the trading in individual equities as well as a "stock basket" proxied by the S&P 500 futures contract. The results affirm the that the expected link between company-specific information and trading volume exists and that the effect is particularly significant for small firms, while trading in the stock basket is more closely associated with their proxy for market-wide information. Although the proxy for information in the studies of Bessembinder et al. (1996) and Mitchell and Mulherin (1994) differs quite a lot the results are consistent and thus offer evidence on the phenomenon of firm-specific information incorporating to prices through trading. Therefore, in this study, it is assumed that the trading volume in an individual security is a good proxy for the amount of information entering the market about the company and will lead to its information environment being richer and hence the price better anticipating the economic performance of the firm, i.e. earnings.

H2: The price anticipation of earnings is positively related to the amount of trading volume in a share.

3.1.3. Effect of The Strength of The Bank Relationship – Shareholder vs. Stakeholder

Chapter 2 concerning accounting disclosure previously discussed the findings by Ball et al. (2000), which would imply that the properties of accounting income vary across countries depending on the legal and institutional setting. They argue that firms operating in countries belonging to the common-law group and relying on a shareholder corporate governance model exhibit accounting income values that are more timely in incorporating information (especially losses) than firms operating in code-law origin countries. This is because in common-law countries owners are "further" from the management of the firm and informing them through public disclosure and timely accounting income has been important in relation to efficient allocation of funds. Ball, et al. (2000) note, however, that poor public disclosure in code-law countries does not necessarily hamper the flow of information into stock prices since the information flow can instead occur through insider trading.

The role of banks as stakeholders in code-law countries such as Germany and Japan has been traditionally significant. Petersen and Rajan (1994) note that a strong banking relationship can help to lower the cost of capital through close and continued interaction that reduces adverse selection and moral hazard. In a bank centred financial system banks will also learn about different industries and firms through time and spread the fixed costs of monitoring and thus offer financing at low cost. However, Rajan (1992) notes that in concentrated banking systems relationship-specific informational monopolies are likely to exist. Banks are not wiling to share their company-specific information because as well as being able to offer financing at a lower cost they can also reap higher than optimal rates and thus reallocate the profit sharing between the principal and the agent. Additional problems are caused for the growth of innovative firms, which try to seek financing for rapid expansion based on future prospects as opposed to current net worth, because of lack of collateral [Modigliani and Perotti (2000)]. Already Myers (1977) argues that the lack of a developed equity market is a particularly serious disadvantage for the emergence and growth of innovative firms.

Finland, measured by stock market capitalisation over GNP, ranked poorly among developed country in the late 1980s (capitalization/GNP 0,20 for Finland compared to an average of 0,73 for developed countries in 1986 [Modigliani and Perotti (2000)]) while the respective statistic had "improved" somewhat in 1993 (0,25 and 0,54 respectively). As discussed earlier, the emergence of the Finnish stock market can be traced back to the liberalization process that branded the financial

system in the late 1980s and early 1990s [Vaihekoski (1997)]. One of the most significant factors in the development was the establishment of the Securities Market Act in 1989, which improved investor rights. E.g. Modigliani and Perotti (2000) argue that the relative attractiveness of security versus intermediate finance is most sensitive to the quality of legal enforcement. Thus an inadequate legal framework impairs the development of security markets, allowing expropriation of small shareholders and bondholders. In Finland, the institutional financial arrangements have been typically described as a private, debt based system [see e.g. Ihamuotila (1994)] and banks have been considered to be the main source of external capital for firms. This influence was magnified by the fact that Finnish banks used to form so called 'power spheres' by cross-ownership of other banks and firms shares in their power sphere [Seppänen (1999)]. However, the recession of the early 1990s, which had a severe effect on Finnish banks, has undoubtedly weakened some of the power they have had in the Finnish institutional setting. As a consequence, listed firms have increased the amount of arms-length versus bank finance in the 1990s and the general attitude towards corporate governance has been slowly shifting from a stakeholder view to a shareholder perspective.

Seppänen (1999), using a random sample of 42 Finnish listed firms between 1990-1992, studied the link between external financing related arrangements and companies general accounting disclosure practices in a relationship financing environment. He builds on the arguments of Healy and Palepu (1993, 1995), Baiman and Verrecchia (1996) and Frost (1996) who have earlier argued and found evidence for relationship financing arrangements to decrease management's incentives to provide public voluntary disclosure of value-relevant information because of close working relations with their main source of external capital. However, Seppänen's (1999) study specifically focuses on the link between external finance and corporate disclosure within a relationship financing setting, while other authors have normally concentrated on conducting inter-country comparisons between financial systems, e.g. the US vs. Germany. The results in Seppänen (1999) indicate that firms with a high degree of private debt make less frequent disclosure (i.e. forward-looking disclosures and timely documents of material information) and provide less timely annual earnings information. Also, firms which are members of a bank's power sphere provide less frequent and timely interim reports.

In this study it is hypothesized that the bank relationship-specific information monopolies distinguished by Rajan (1992) and the lower disclosure incentives for value relevant information by firms with a high degree of private debt [Seppänen (1999)] will lead to differences in quality of firms' information environments. Consequently, the firms that have maintained a stronger bank

relationship in Finland during the sample period, which is measured by the amount of bank finance, have showed a lesser tendency to adopt improved investor information practices and can be labelled as still having a "stakeholder" corporate governance approach.

H3: The price anticipation of earnings is negatively related to the strength of a firm's bank relationship.

3.2 Summary Table of Hypotheses

Summary Table of Hypotheses to Be Tested

Hypothesis	Based on	Expected Empirical Result
H1: The price anticipation of earnings is positively related to firm size proxied by market value.	Atiase (1980,1985), Freeman (1987), Beaver et al. (1980), Donnelly and Walker (1995).	When previous years' returns are added to the dependent variable in a returns earnings regerssion using current periods' unexpected accounting earnings regressed on current period's returns the ERC increases most for large firms and increases the least for small firms.
H2: The price anticipation of earnings is positively related to the amount of trading volume in a share.	Atiase (1980), Freeman (1987), Bessembinder et al. (1996), Mitchell and Mulherin (1994).	When previous years' returns are added to the dependent variable in a returns earnings regerssion using current periods' unexpected accounting earnings regressed on current period's returns the ERC increases most for firms that have a highly traded share series and increases the least for firms that have an illiquid share series.
H3: The Price anticipation of earnings is negatively related to a firm's bank relationship.	Rajan (1992), Healy and Palepu (1993, 1995), Baiman and Verrecchia (1996), Frost (1996), Seppänen (1999).	When previous years' returns are added to the dependent variable in a returns earnings regerssion using current periods' unexpected accounting earnings regressed on current period's returns the ERC increases most for firms that have a low amount of relationship capital and increases the least for firms with a high amount of relationship capital.

4. METHODOLOGY

Mapping the relationship between accounting earnings and security returns in an empirical design has been one of the major themes in capital market based accounting research. As discussed earlier, the research field is generally interested in the value relevance of accounting disclosures and often uses regressions of price or returns on accounting variables and uses the R^2 (explanatory power) of the regression to denote value relevance. An important assumption imbedded in the approach is that an accounting amount will be value relevant, i.e. have a predicted significant relation with share prices, only if the amount reflects information relevant to investors in valuing the firm and is measured reliably enough to be reflected in share prices. As well as measuring R^2 value relevance studies often test predictions relating to coefficients, as is the case with returns earnings research and the ERC [Barth et al. (2001)]. As Brown et al. (1999) note in their study on the value relevance of accounting numbers from the last four decades, the found R^2 values have normally been low and in the 1990s there have been numerous studies that try to explain the weak association [see e.g. Lev (1989), Easton and Harris (1991), Easton et al. (1992), Hayn (1995)]. The next section will present the theoretical link between returns and earnings as well as the regression specification used in the empirical part of this study.

4.1 Regression Models – Dependent and Independent Variable

The earnings response coefficient (ERC) is the coefficient that links a change in earnings to return or a change in prices in a regression. The regression can generally be formulated as

$$R = a + \beta X + \varepsilon \tag{4}$$

where R is the price or return over a period and X is the selected earnings component depending on the model used. The slope coefficient β is called the earnings response coefficient (ERC). Normally capital market prices are assumed to react only to information that is not known by the market beforehand. This is because investors will make adjustments to valuation based on future expected cash flows that will be affected by the unanticipated component of earnings. This will lead to abnormal returns in the markets that are typically captured in an event-study context over a short period around the earnings announcement. The returns earnings relation can in this setting be formulated as follows

$$CAR_{it} = a + \beta UX_{it} + \varepsilon_{it} \quad (5)$$

CAR being the risk-adjusted return for security i over period t, UX a measure of unexpected earnings and ε a random disturbance term respectively. β is the approximated ERC.

The exact formulation of the relation, what is used as the dependent and independent variable, will define the predictive power of the model and its possible econometric problems. Methodological papers in the research field usually agree on the fact that unexpected earnings are the appropriate independent variable but it is difficult to find an appropriate proxy. Researchers often use the change in earnings (previous year's accounting earnings subtracted from current year's accounting earnings) to proxy for unexpected earnings since it implicitly assumes that earnings follow a random walk, which has been proved empirically [e.g. Ball and Watts (1972) and Albrecht et al. (1977)], and prices do not lead earnings. Basically, if earnings change is an inappropriate proxy for earnings this is only because the underlying assumptions that link the earnings to prices through valuation are not valid, not because of a weakness in researchers logic [Kothari (1992)].

It is important to differentiate between ERC studies using the event study and the association study method when thinking about the unexpected earnings proxy to be used in empirical designs. In an event-study setting analysts' forecasts are often used to proxy for unexpected earnings since time-series expectations are likely to be noisy due to the market's access to information between earnings announcements. The unexpected earnings in a short span of time around the earnings announcement can then be measured as the difference between the actual observation and analysts' forecast. In an association study 'unexpected earnings' can also be shown to be the best explanatory variable [Kothari (1992)] but such a proxy is difficult to attain. The choice of the model thus hinges on which proxy for unexpected earnings is less noisy rather than which should be the explanatory variable. Therefore, as demonstrated in detail later on in this chapter, researchers continue to use the absolute change in earnings or the 'earnings level' (the total accounting earnings of the period in question) as the explanatory variable for returns because their use can be reasoned through the use of simplified valuation models and earnings following a random walk. Using leading period returns in the dependent variable in association studies can be seen as a way of controlling for the apparent inaccuracy of the unexpected earnings proxy since the expectations of the market, and hence also analysts, are imbedded in the price observations of previous periods [Kothari and Sloan (1992)].

Thus, recent research draws the conclusion that there is no clear agreement on the functional form of the relationship [Donnelly (2002), Kothari (2001)], and as a result studies tend to use alternative methods to see whether there is a difference in the predictive power of the regression models [e.g. Francis and Schipper (1999)]. Kothari and Zimmerman (1995) conclude that researchers usually have to define between price models in which stock prices are regressed on earnings per share or return models in which returns are regressed on an earnings variable. The price model can be generally formulated as

$$P_i = \alpha + \beta X_t + \varepsilon_t \tag{6}$$

where P is the ex-dividend price at time t, X is earnings per share for period t, α and β are the intercept and slope coefficients and ε is an error term. The return model can be formulated as (Donnelly 2002)

$$P_t / P_{t-1} - 1 = \alpha + \beta X_t / P_{t-1} + \varepsilon_t \tag{7}$$

or

$$P_t / P_{t-1} - 1 = \alpha + \beta(\Delta X_t / P_{t-1}) + \varepsilon_t \tag{8}$$

where the first model (7) is referred to as the 'level' and the latter (8) as the 'change' model. Christie (1987) shows that the models are equivalent, they yield a slope coefficient of 1/r [(1+1/r) when returns inclusive of dividends are used, Kothari (1992)] where r is the expected rate of return, when some critical assumptions are made about the nature of the earnings. In essence, for the models to yield the same results, earnings are expected to follow a random walk, only information about earnings affect stock prices and only the information in the current and past time series of earnings are used in setting prices, i.e. prices do not lead earnings. The details of this analogy can be found e.g. in Christie (1987) and Kothari and Zimmerman (1995). Based on the underlying similarity of the two models, Christie (1987) argues that the choice between the alternatives has to be guided by econometric issues or because violation of one of the underlying assumptions has a differential effect across different specifications. Price specifications are more likely to suffer from econometric problems and this is why return models are preferred [Christie (1987), Kothari and Zimmerman (1995)]. An example of an econometric issue in price regressions is noted in Brown et

al. (1999) who argue that regressing an accounting variable on price per share will subject the model to severe scale effects. They conclude that this may cause researchers e.g. to falsely believe that value relevance of accounting has increased through time.

4.2 Link to Valuation

The research interest in earnings response coefficients stems from their potential use in valuation, as they should theoretically provide evidence of earnings use in markets' security pricing. Christie (1987) puts it simply: value is a function of expected cash-flows, which are in turn functions of signals emanating from accounting information. Holthausen and Watts (2001) note that in the valuation-literature the underlying theories are not normally specified and have to be cleaned from the experimental designs. This is probably the case since profound methodological treatment of the link between prices and earnings through a valuation specification is an extensive task and is normally a subject of a research paper on its own. Most importantly however, the general consensus among academics seems to be that the best test of usefulness for accounting information is their predictive power relative to security values whether it is a through a direct valuation or inputs-to-valuation theory. In the following I will present the basic reasoning behind the research models used in the empirical part of the study. For more thorough explanations and derivations of the models the reader should refer to the papers cited.

4.2.1 Earnings Based

Assuming [see e.g. Kormendi and Lipe (1987) and Kothari (2001)] that we use the discounted net cash flow model as the basis and that earnings innovations equal net cash flow innovations, an earnings innovation of €1 will have a present value of (1+1/r) where r is the annual risk-adjusted discount rate for the equity. It will be a function of the €1 innovation plus the discounted present value of the revision in expectations' of all future period earnings. However, in the above case we assume the earnings innovation to be completely permanent and consequently the time-series properties of earnings will in part determine the magnitude of the relation. Thus, earnings response coefficients are a mapping of earnings' time-series properties and discount rates into equity values. Evidence from the research literature [see e.g. Kormendi and Lipe (1987) and Easton and Zmijevski (1989)] implies that the ERC ranges from 1 to 3 in a contemporaneous setting. A discount rate of 10% and permanent earnings would give reason to expect ERCs in the magnitude of 11 (=1+1/0,1). Also, if one assumes the price earnings multiple to give a good estimation of the ERC we should

observe figures well above 10 depending on the industry and time-period. The model which depicts prices as a multiple of earnings is the one used early on in the research e.g. in the first prices lead earnings study by Beaver et al. (1980). There are multiple versions of the model used in the research depending on the specification of the independent variable. I will present the one following Easton and Harris (1991), which makes it simple to compare the 'change' and 'level' specifications.

If price is a multiple of earnings

$$P_{jt} = \rho X_{jt} + v_{jt} \tag{9}$$

where P is the price of the security of firm j at time t, ρ is the multiplier (P/E –ratio), X the annual earnings per share of firm j at time t and v an error term. Beaver et al. (1980) specify that the multiplier imbed all the other factors that might influence price such as interest rate risk, dividend payout, earnings growth and accounting practices. Ohlson (1989) demonstrates that the Miller and Modigliani (1961) dividend irrelevance proposition requires that if a dividend is paid on security j at time t equation (9) must be written as

$$P_{jt} + d_{jt} = \rho X_{jt} + v_{jt} \tag{10}$$

and it follows that

$$(\Delta P_{jt} + d_{jt}) / P_{jt-1} = \rho[\Delta X_{jt} / P_{jt-1}] + v'_{jt} \tag{11}$$

One can then see that in (11) there is a linear relation between change in earnings divided by beginning of period price and security returns over that period.

4.2.2. Balance Sheet Based

A significant innovation in ERC research was the paper by Easton and Harris (1991). They argued that the return earnings relation should be formulated based on the book value valuation model [Ohlson (1989)], which would effectively mean that the independent variable in the regression should be earnings deflated by price not earnings change deflated by price. The underlying

reasoning was that if the book value of equity is a noisy proxy for the market value of equity and assuming clean surplus earnings measure the change in the market value of equity. If the balance sheet perspective of Easton and Harris (1991) is adopted the predicted coefficient of earnings is one, which would imply earnings being completely transitory. As an example [Donnelly (2002)], consider a €1 increase in earnings (X) if BV (book value) = MV (market value). Then, assuming no dividends, ΔBV = X and

$$P_{it} / P_{it-1} = \Delta MV_{it} / MV_{it-1} = X_{it} / MV_{it-1} \tag{12}$$

Easton and Harris (1991) show in a simplistic way how this leads to the regression model. Consider

$$P_{jt} = BV_{jt} + u_{jt} \tag{13}$$

where P is the share price of firm j at time t, BV is the book value of firm t at time j and u is the difference between P and BV. The difference (u) between book value of equity and market price can result from a number of issues, most notably from conservative accounting numbers. The relation between the "flow" variables -- accounting earnings and security returns – may be obtained by taking first differences of the variables in equation (10). This yields

$$\Delta P_{jt} = \Delta BV_{jt} + u'_{jt} \tag{14}$$

But, in general

$$\Delta BV_{jt} = X_{jt} - d_{jt} \tag{15}$$

where X is accounting earnings per share of firm j over the time period [t-1, t] and d is dividends paid per share by firm j over time period [t-1, t]. Substituting (15) into (14), rearranging and dividing by P_{jt-1} yields:

$$(\Delta P_{jt} + d_{jt}) / P_{jt-1} = X_{jt} / P_{jt-1} + u''_{jt} \tag{16}$$

So if book value and price are related, as Easton and Harris (1991) presume, earnings divided by beginning of period price should be an appropriate variable for explaining returns.

The similarity of the two specifications (book value based, earnings based) can be seen by dividing (10) by beginning of period price, which yields:

$$(P_{jt} + d_{jt}) / P_{jt-1} = \rho[X_{jt} / P_{jt-1}] + \upsilon''_{jt} \qquad (17)$$

and suggests that also from an earnings valuation perspective earnings levels will be associated with returns.

Kothari (2001) notes that while the Easton and Harris (1991) model may be useful in return earnings research specifications, its basic assumptions are somewhat unsatisfactory since earnings are highly persistent. Nevertheless, by using earnings and earnings change deflated by price Easton and Harris (1991), using 20 188 firm-year observations from 1969 to 1986 gathered from the Compustat database, obtained results which showed that the earnings 'level' variable was at least as important in explaining returns as earnings 'change'. In addition, both were found to have explanatory power in a multivariate regression. This sparked researchers in the 1990s to broadly use earnings level deflated by price as an explanatory variable for returns in empirical papers [see e.g. Hayn (1995), Martikainen (1998), Francis and Schipper (1999)].

4.3 Definition of Prices Leading Earnings

Current prices have predictive power in relation to future earnings because historical cost accounting has a limited ability to reflect the market's expectations for future period's earnings, i.e. the information set in stock prices is richer than in the past series of earnings. This was discussed in Chapter 6 and empirical evidence has been provided by e.g. Beaver et al. (1980), Easton et al. (1992), Kothari and Sloan (1992), Kallunki and Martikainen (1997) and Donnelly (1998). The choice of the appropriate regression model in prices leading earnings context has been covered in several papers, which specifically treat the choice of the model from an empirical viewpoint keeping in mind the underlying valuation logic. Here, I will present the two of the most commonly used specifications that will be applied in the empirical part of the study. More specifically, it is now shown what the effect on the regression and its explanatory power will be when the prices do not lead earnings assumption is relaxed.

When prices lead earnings the market's expectation of current period earnings will differ from a time-series expectations. The time-series of earnings is best characterized by a random walk, as previously mentioned, so the unexpected earnings was in this context assumed to be the change in annual earnings. It follows that if prices lead earnings the market has already anticipated part of the change in periods t-1 and t-2 and only a portion will be a surprise in the current period. Following Kothari (1992) it can be shown how the prices leading earnings context leads to changes in the explanatory power in a returns earnings regression. If prices lead earnings by one period

$$X_t = X_{t-1} + x_t + Lx_t \tag{18}$$

where

$$x_t + Lx_t = \Delta X_t \tag{19}$$

x_t is the component of ΔX_t that is a surprise to the market in period t (contemporaneously) whereas Lx_t is the component of ΔX_t that the market anticipates by the beginning of period t, and x_t and Lx_t are uncorrelated. Since information about Lx_t reaches the market in period t-1, but earnings do not incorporate this until period t, the market-unexpected earnings are x_t. The time-series surprise is ΔX_t because earnings follow a random-walk. The market's expectation of future periods' earnings at time t, under the above assumptions, is

$$E_t(X_{t+k}) = X_t + Lx_{t+1} \qquad \text{for } k \geq 1 \tag{20}$$

This implies that the stock price, under the expectations of a perpetuity, would be

$$P_t = (X_t + Lx_{t+1})/r \tag{21}$$

So, when prices lead earnings investors also use the anticipated component of next periods earnings to form the value of a security. Equation (21) is basically a transformation of (9) since r is expected to be constant through time, $(1/r) = \rho$.

4.4 Implications of Prices Leading Earnings to The Regression Models

4.4.1. Earnings Level as The Explanatory Variable

Kothari (1992) further demonstrates what the effect on the contemporaneous returns earnings regression and its explanatory power will be assuming prices lead earnings by one period. Consider the 'level' equation

$$P_t / P_{t-1} = \alpha + \beta X_t / P_{t-1} + \varepsilon_t \tag{22}$$

then

$$\begin{aligned} \beta &= [\mathrm{cov}(X_t / P_{t-1}, P_t / P_{t-1})] / \mathrm{var}(X_t / P_{t-1}) \\ &= [\mathrm{cov}\{(X_{t-1} + Lx_t + x_t) / P_{t-1}, P_t / P_{t-1}\}] \\ &\quad / \mathrm{var}\{(X_{t-1} + Lx_t + x_t) / P_{t-1}\} \end{aligned} \tag{23}$$

Equation (23) is simplified by substituting $(X_{t-1} + Lx_t) / P_{t-1} = r$ (see equation 21), which is a constant. Thus, while X_t contains X_{t-1} and Lx_t, both of which are irrelevant in explaining contemporaneous return, P_t / P_{t-1}, deflation by P_{t-1} decomposes the earnings variable into a constant, r, and x_t / P_{t-1}, the component that is relevant to explaining P_t / P_{t-1}. Equation (23) reduces to

$$\beta = \mathrm{cov}(x_t / P_{t-1}, P_t / P_{t-1}) / \mathrm{var}(x_t / P_{t-1}) \tag{24}$$

By this Kothari (1992) shows that while x_t and Lx_{t+1} together generate the period t return, only the component of P_t / P_{t-1} that relates to the information in x_t covaries with x_t / P_{t-1}. And because x_t, the included variable, and Lx_{t+1}, the omitted variable, are mutually uncorrelated, the estimated coefficient is not biased. The explanatory power of the regression is

$$R^2 = \beta^2 \mathrm{var}(X_t / P_{t-1}) / \mathrm{var}(P_t / P_{t-1})$$

$$= \text{var}(X_t / P_{t-1}) / r^2 \text{ var}(P_t / P_{t-1}) \quad (25)$$

and depends on the relative variances of x_t and Lx_{t+1}. The larger the variance of Lx_{t+1}, the greater the degree of market anticipation of t+1 period's earnings, and the lesser the surprise in period t's earnings. Since var (P_t / P_{t-1}) is generated by the sum of the information in x_t and Lx_{t+1}, if the variances of x_t and Lx_{t+1} are assumed equal, then the R^2 in (25) will be

$$R^2 = 0{,}5[\text{var}\{(x_t + Lx_{t+1}) / P_{t-1}\} / r^2 \text{ var}(P_t / P_{t-1})] = 0{,}5 \quad (26)$$

This would mean that the explanatory power of a contemporaneous return earnings regression would reduce to 50 percent if prices lead earnings by one period and 50 percent of the variance in earnings is assumed to be anticipated one period ahead. Kothari (1992) concludes that this would still be a high explanatory figure compared to research results [Kothari and Sloan (1992), Collins et al. (1994)], which suggests that returns anticipate earnings by more than one period and/or the results can be contributed to restrictive assumptions underlying the simple valuation model.

4.4.2. Earnings Change as The Explanatory Variable

If earnings change is used as the explanatory variable in a returns earnings regression following the same method [Kothari (1992)] we get

$$\begin{aligned}\beta &= [\text{cov}(\Delta X_t / P_{t-1}, P_t / P_{t-1})] / \text{var}(\Delta X_t / P_{t-1}) \\ &= \text{cov}[(Lx_t + x_t) / P_{t-1}, P_t / P_{t-1}] / \text{var}[(Lx_t + x_t) / P_{t-1}] \\ &= \text{cov}(x_t / P_{t-1}, P_t / P_{t-1}) / \{\text{var}(Lx_t / P_{t-1}) + \text{var}(x_t / P_{t-1})\} \end{aligned} \quad (27)$$

and because Lx_t is known to the market during the period t-1, we substitute $\text{cov}(Lx_t / P_{t-1}, P_t / P_{t-1}) = 0$ and make use of the assumption that Lx_t / P_{t-1} and x_t / P_{t-1} are mutually uncorrelated. If (as in the level specification before) the variances of Lx_t and x_t are assumed equal, then (27) simplifies to the approximate equality

$$\beta \approx \text{cov}(x_t / P_{t-1}, P_t / P_{t-1}) / 2 * \text{var}(x_t / P_{t-1}) \quad (28)$$

and $E(\beta) \approx 0{,}5 * (1/r)$. The equality is an approximation because

$$\text{var}(Lx_t / P_{t-2}) = \text{var}(x_t / P_{t-1}) \tag{29}$$

but the term in (17) is $\text{var}(Lx_t / P_{t-1})$. Since P_{t-1} is affected due in part by the information in Lx_t, $\text{var}(Lx_t / P_{t-1})$ is only approximately equal to $\text{var}(Lx_t / P_{t-2})$. The difference, product of two variances, is of second-order magnitude here. The finding is that the earnings response coefficient is approximately 50 percent biased in a contemporaneous returns earnings regression when prices lead earnings by one period. The R^2 is given by

$$\begin{aligned} R^2 &= \beta^2 * \text{var}(\Delta X_t / P_{t-1}) / \text{var}(P_t / P_{t-1}) \\ &= (0{,}25 / r^2) * 2\,\text{var}(x_t / P_{t-1}) / \text{var}(P_t / P_{t-1}) \\ &= 0{,}25. \end{aligned} \tag{30}$$

Because $\text{var}(x_t / P_{t-1}) / r^2\ \text{var}(P_t / P_{t-1}) = 0{,}5$ from (17) and (21). Thus, when prices lead earnings Kothari (1992) shows that the R^2 of the change specification is lower than that using the level specification.

4.4.3. Prices Leading Earnings by Multiple Periods

When prices lead earnings by more than one period we can formulate generally that

$$X_t = X_{t-1} + x_t + Lx_t + L^2 x_t + \ldots \tag{31}$$

where x_t is the component of ΔX_t that is a surprise to the market in period t (contemporaneously), Lx_t is the component of ΔX_t that the market learns about in period t-1, $L^2 x_t$ is the component of ΔX_t that the market learns about in period t-2 and so on. x_t , Lx_t , $L^2 x_t$ and additional anticipation components are assumed to be uncorrelated. Kothari (1992) shows, by using the same derivations as in the prices lead earnings by a single period setting, that when prices lead earnings by two periods

and the X_t / P_{t-1} specification is used as an explanatory variable the contemporaneous R^2 is only 16,7 percent. When $\Delta X_t / P_{t-1}$ is used instead of X_t / P_{t-1} the explanatory variable further reduces to about 11 percent. In short, price anticipation of earnings will dramatically reduce the association between returns and earnings in a normal contemporaneous association study setting. Kothari (1992) notes that with earnings anticipation more than two years in advance, variation in the expected rate of return through time, and shocks to the expected rates of return, any deviation from the random-walk time-series property of annual earnings and accrual manipulation will collectively tend to lower the explanatory power.

Donnelly and Walker (1995) build on the analysis in the papers by Kothari (1992) and Kothari and Sloan (1992). They find that by using different proxies for the unexpected earnings it is possible to differentiate between the information arriving in different time periods in the random-walk setting if prices are assumed to lead earnings. Detailed proof and derivations can be found in Donnelly and Walker (1995). Donnelly (1998), building on this proof, defines the setting in which the empirical analysis of prices leading earnings and its determinants can be done. Remembering that Kothari (1992) shows that when prices lead earnings by one period the 'change' variable produces biased estimates of the ERC but the 'level' produces unbiased estimates in a contemporaneous regression of returns on earnings. Donnelly and Walker (1995) demonstrate that the following model estimates unbiased ERCs provided that prices lead earnings by no more than one period

$$(P_t / P_{t-2}) / P_{t-2} = \alpha + \beta \Delta X_t / P_{t-2} + \varepsilon_t \qquad \text{"D2"}$$

In general it can be shown that if

$$(P_t - P_{t-\tau}) / P_{t-\tau} = \alpha + \beta (X_t - X_{t-1}) / P_{t-\tau} + \varepsilon_t \qquad \text{"}D\tau\text{"}$$

$$(P_t - P_{t-\tau}) / P_{t-\tau} = \alpha + \beta X_t / P_{t-\tau} + \varepsilon_t \qquad \text{"}L\tau\text{"}$$

the D3 specification produces unbiased estimates of ERCs when prices lead earnings by two periods, D4 produces unbiased estimates of ERCs when prices lead earnings by three periods and so on. By using Kothari's assumptions Donnelly and Walker (1995) also show that L2 produces unbiased ERCs when prices lead earnings by one or two periods and L2 yields an unbiased estimate of ERC when prices lead earnings by two or three periods. Despite the slight difference of the

models Donnelly and Walker's (1995) empirical findings based on a UK sample do not, however, support $L\tau$ being less biased than $D\tau$.

The strength of the approach presented above is that the difference in ERC (ΔERC) measured by the models that include leading period prices and those that do not can be used as a measure of price association with current earnings that is not captured by the contemporaneous regression. Therefore, ΔERC ($D\tau - D1$ or $L\tau - L1$, $\tau > 1$) is a measure of the information, relevant for the prediction of the earnings for time t, contained in the price between time $t-\tau$ and time $t-1$.

The empirical part of this study will use the $D\tau$ and $L\tau$ models to differentiate between ERCs approximated with different amount of leading years' returns included in the dependent variable. It should be noted that total amount of accounting earnings rather than accounting earnings per share are used in the independent variable due to practical reasons. Consequently the deflator of the explanatory variable is a firm's total market value instead of market price of its share.

5. DATA

5.1. Sample Companies and Period

The 27 companies in the study are selected based on four main criteria: returns data has to be available between 1.4.1990-1.4.2002, annual earnings figures have to be available for the period 1992-2001, the selected firm needs to have a financial year ending on the 31 December and it has to be continuously listed on the Helsinki Stock Exchange (HEX) Main List. Financial firms (bank and insurance companies) are excluded because of their different accounting practices. The criteria listed is needed since the same sample of earnings has to be used so that ERC estimates with and

Table 1

Industry Classification & Weights for Sample and HEX Main List Firms at the End of the Sample Period (2002)*

	HEX ML	Sample	HEX ML (%)	Sample (%)	Number of Firm Years**
Banks and Finance	6	excl.	5.66	excl.	0
Insurance	1	excl.	0.94	excl.	0
Investment	7	3	6.60	11.11	27
Transport	5	2	4.72	7.41	18
Trade	4	4	3.77	14.81	36
Other services	7	2	6.60	7.41	18
Metal and Engineering	14	6	13.21	22.22	54
Forest Industry	4	2	3.77	7.41	18
Multi-Business	2	0	1.89	0.00	0
Energy	2	0	1.89	0.00	0
Food Industry	8	3	7.55	11.11	27
Construction	3	0	2.83	0.00	0
Telecomm. and electr.	26	2	24.53	7.41	18
Chemicals	3	1	2.83	3.70	9
Media and Publishing	5	0	4.72	0.00	0
Other Industries	9	2	8.49	7.41	18
Total	**106**	**27**	**100.00**	**100.00**	**243**

* As reported by HEX, ** each firm has 9 earnings observations from 1993 to 2001 used in the main tests.

without leading period returns can be compared. The Main List -criterion is essential since I plan to research the relation between the sample firms' informational environments and the price anticipation of earnings. Mandatory investor communication, specified by the Rules of the Helsinki Securities Exchange differs between the Main List and other lists (I-list, NM-List). Most notably, where companies listed on the HEX Main List have to prepare interim reports for each 3 month period during the financial year according to the Rules of the Helsinki Stock Exchange[4], the ones

[4] Arvopaperipörssin ohjesääntö, downloadable at http://www.hex.com/en/rules/index.html

listed on the NM or I-list only have to publish an interim report for the first six months according to the Rules of Other Public Trading[5]. There is also a general tendency to regard the firms listed on the Main List to have wider visibility and investor recognisance, which is often cited as a reason to move from the NM and I-list to the Main List when other entry criterion have been met. Therefore, there is reason to believe that the investor communication requirements and information environments are reasonably comparable only for the companies that have been continuously listed on the HEX Main List. A list of the sample companies can be found in Appendix 1, industry classification and comparison to all firms listed on the HEX Main List at the end of the sample period is given in Table 1[6].

Table 2

Industry Classification & Weights for Sample and HEX Main List Firms at the Beginning (1990) and Middle (1995) of the Sample Period*

	1990				*1995*			
	HEX ML	Sample	HEX ML (%)	Sample (%)	HEX ML	Sample	HEX ML (%)	Sample (%)
Banks and Finance	8	excl.	10.00	excl.	6	excl.	8.96	excl.
Insurance and Invest.	16	3	20.00	11.11	8	3	11.94	11.11
Other Services	17	7	21.25	25.93	14	7	20.90	25.93
Metal and Engin.	7	4	8.75	14.81	9	5	13.43	18.52
Forest Industry	5	2	6.25	7.41	4	2	5.97	7.41
Multi-Business	12	8	15.00	29.63	8	6	11.94	22.22
Other Industries	15	3	18.75	11.11	18	4	26.87	14.81
Total	**80**	**27**	**100.00**	**100.00**	**67**	**27**	**100.00**	**100.00**

* As reported by HEX and in "Pörssiyhtiöt" booklet edition 1995 and 1990 published by Merita Investment Bank (ex-KOP) and Kauppakaari-Yhtymä.

Table 2 gives an idea of how the sample companies have represented a larger portion of all HEX Main List firms in the beginning of the sample period. The 27 selected companies presented 33,75%, 40,30% and 25,47% of all HEX Main Listed firms in 1990, 1995 and 2002, respectively. In 1993, when a severe recession had had a negative impact on the Finnish economy and the number of new issues was low the sample companies accounted for almost half of all the HEX Main Listed firms (58 firms and 46,55%).

[5] Muun julkisen kaupankäynnin ohjesääntö, downloadable at http://www.hex.com/en/rules/index.html

[6] It should be noted that the number of listed firms and securities differs in HEX because some firms have traditionally had two share series issued, typically one of the share series has multiple voting rights compared to the other.

Clearly, the are some features of the sample that should be kept in mind when interpreting the results. Firstly, it will automatically be prone to survivorship bias and large, more profitable firms will have a higher probability of figuring in the sample. Secondly, the distinct feature that has branded the Helsinki Stock Exchange in the latter part of the 1990s, the emergence of the Telecommunication sector and the Nokia cluster, will not affect the results significantly since there are only two companies from the sector in the sample. Thirdly, in comparison to the second point, stable traditional industries (Trade, Metal and Engineering, Food) will have a larger representation in the sample.

The beginning of the sample period was chosen based on several factors. In Finnish capital market history a significant change in trading procedure was the introduction of the HETI-system (Helsinki Stock Exchange Automated Trading and Information System), which was fully operational from

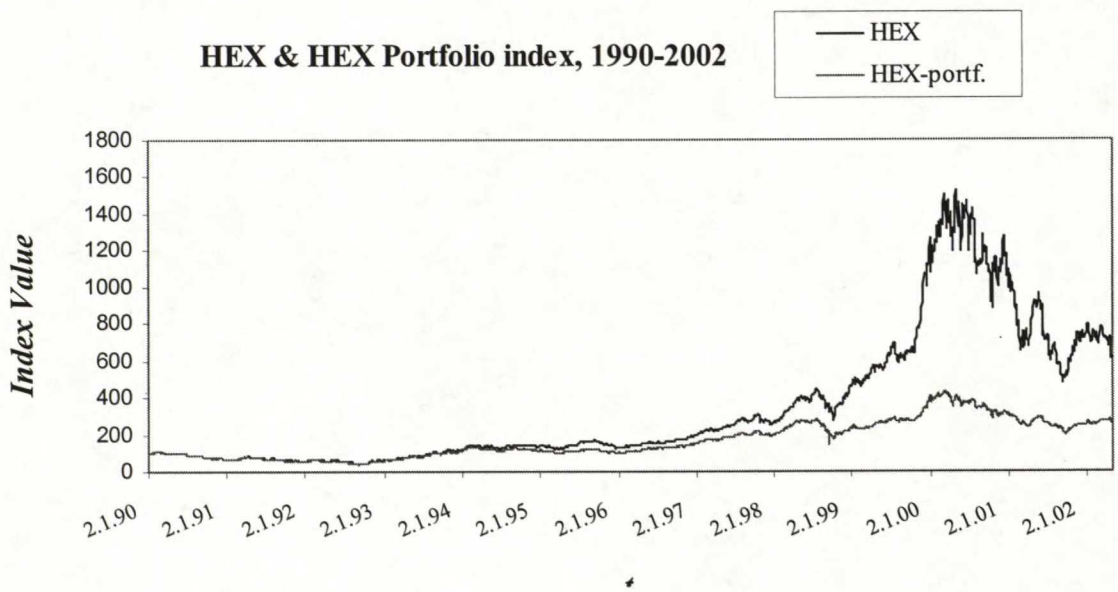

Chart 1: The development of the HEX-General and the HEX-Portfolio index between 2.1.1990 (100) and 1.4.2002

1.4.1990 onwards. Consequently the calculation of a real time HEX Main Index was started in June 1990. The introduction of the HETI-system combined with the establishment of the Securities Market Act (1989) was a major step in the development of equity trade and security markets in

Finland especially in respect to improved investor protection[7]. There are also several companies in the sample group that entered the HEX Main List in the end of the 1980's when equity issue conditions were favourable. The chosen research period allows for these firms to be included in the sample.

As can be seen from Chart 1 the effects of the security market boom and bust around the change of the millennium were also severely felt in Finland. The index data for both the HEX Main Index and the HEX Portfolio Index is displayed from 1.1.1990 onwards until the end of the sample period (1.4.2002). The index values do not represent the real values quoted by HEX and the series start from 100 for both the Main Index and the Portfolio Index respectively. The Portfolio Index is generally a better indicator of overall share performance during the sample period in relation to my sample group because of the high proportional weight of Nokia Oyj in the Main Index after 1997 (3% in 1991 → 70% at peak in 2000).

5.2 Sample Returns

The data used in this study is mostly gathered from the databases in use at the Helsinki School of Economics (HSE). The return data is gathered from the HEX-database, which includes raw price

Table 3

Return on Main HEX Indexes and on Sample Firms During the Research Period in %

Year	HEX-General*	HEX-Portf.**	HEX-25***	Sample mean	Sample med.
1990-1991	-23.07	-23.15	-19.85	-25.88	-31.58
1991-1992	-29.87	-29.96	-32.31	-11.64	-12.56
1992-1993	26.89	26.28	27.08	57.04	37.00
1993-1994	67.36	66.25	112.39	88.86	90.69
1994-1995	-6.35	-17.81	-3.52	-22.00	-22.08
1995-1996	13.50	13.90	21.58	30.73	20.24
1996-1997	52.07	46.48	44.39	70.52	60.80
1997-1998	58.41	44.63	49.78	38.68	25.05
1998-1999	52.94	-5.31	7.72	-13.19	-18.73
1999-2000	137.84	58.44	95.44	25.05	12.10
2000-2001	-48.13	-42.08	-47.51	-15.23	-11.37
2001-2002	-13.25	7.41	3.21	37.18	29.97
Mean	**24.03**	**12.09**	**21.53**	**21.68**	**14.96**

Notes: Return cumulation for the indexes and for the firms (adjusted for dividends and capital issues) is started on the first trading day of April in year t and ended on the first trading day of April the following year (t+1). * Unlimited weight for any given share, ** weight of individual share limited to 10%, *** 25 most highly traded shares in EUR included.

[7] The Development From National Capital Markets to A Global Marketplace – HEX 90 years; Särömaa Maija, Kauko Hanna; HEX publications 2002.

series and daily corrected returns for each share. Returns are eventually calculated from a price series that is corrected for dividends, issues, splits and other capital changes individually for every firm. Return cumulation is started in the beginning of April in year *t* and continued until the beginning of April in *(t+1)* for a contemporaneous regression on the unexpected accounting earnings of year *t* and the same cumulation method is used when leading period returns are used to estimate ERCs (specific date is the first trading day of April). This is done to take into account the post-announcement drift and the consequent delay in price adjustment. Large Finnish listed firms normally report their audited accounts for year *t* during January and February of *(t+1)*. The results are based on using raw returns, which is the concept applied mostly in the recent relevant literature [see e.g. Kothari (1992), Kallunki and Martikainen (1997), Donnelly (1998)]. Some papers in the research field use unexpected returns, which are calculated by applying a market index or a beta-estimation approach. Evidence in the literature seems to imply that using sophisticated methods of unexpected returns might not yield any significant benefits. These arguments are presented in detail in e.g. Brown and Warner (1980), Beaver et al. (1987) and Collins and Kothari (1989). In my sample the problem of beta estimation also arises similarly to that in Kinnunen et al. (2000) since most of the shares have entered the HEX Main List close to the beginning of the sample period and thus lack prior return history. However, I have also performed the basic returns earnings regressions by using market-adjusted returns (using the HEX Portfolio Index as benchmark) and the results are fairly similar to those obtained by using raw returns, which is coherent with past research and findings [see Martikainen et al. (1997) for similar results in a comparable research setting in Finland].

As can be seen from Table 3, the sample firms have generally fared better than the HEX-Portfolio Index in terms of yearly returns. However, the sign of the return for the 27 selected companies is always the same as that for the HEX Portfolio Index, which is not the case relative to the other indexes. Comparisons to the HEX General Index are bound to be unfruitful since Nokia's domination is going to offer a distorted picture about the actual performance of HEX Main List firms. All in all, Table 3 confirms the hypothesis of more profitable firms surviving and this is most clearly visible in the HEX Portfolio Index return versus sample firm mean return setting.

5.3 Sample Earnings

Finnish accounting earnings have historically been less value relevant compared to numbers produced by other international accounting standards. This has been a result of a large possibility

for earnings management through discretionary accruals and the special linkage between earnings and corporate taxation (Chapter 2). As a result, Finnish financial analyst aim to adjust published accounting earnings to better describe economic reality. Therefore I have initially compared two different earnings measures inside my sample group: accounting earnings for the financial year published by the company and the same earnings adjusted using the recommendations of the Finnish Committee for Corporate Analysis[8] (COC). The COC-adjusted earnings are retrieved from a database provided by the Research Institute for the Finnish Economy[9] (RIFE) and at use in HSE. Some of the firm's lacked COC-adjusted earnings information in the RIFE database and in these cases the relevant information was retrieved, and the numbers calculated, from the published annual accounts from the Trade Register[10] held by the National Board of Patents and Registration[11] of Finland. The COC-adjusted 'total earnings' are viewed to be a good approximation of the true level

Table 4

Descriptives for Sample Earnings

	Mean		**Median**		**Std.dev.**	
Year	ADJEAR	REPEAR	ADJEAR	REPEAR	ADJEAR	REPEAR
1993	16.60	17.48	7.36	9.67	39.79	38.93
1994	26.73	26.61	15.81	15.89	38.48	39.36
1995	35.06	35.10	19.85	18.84	66.28	59.76
1996	29.16	29.04	24.32	23.48	41.04	39.47
1997	48.67	40.91	28.13	26.61	77.18	52.31
1998	35.16	32.42	20.02	22.07	60.91	48.39
1999	42.41	41.22	31.62	32.75	52.92	48.27
2000	58.71	59.64	27.85	28.34	90.70	93.38
2001	42.57	42.91	32.55	30.70	52.57	51.60

Notes: Includes all the 27 firms in the sample except Nokia which distorts the descriptives as an outlier. ADJEAR = COC-adjusted earnings for the financial year (January-December). REPEAR = reported accounting earnings for the financial year (January-December). All values in € millions.

of economic income and are often used when investigating the relationship between accounting figures and the stock market in Finland. Examples of papers using COC-adjusted earnings are Martikainen (1993), Martikainen et al. (1997) and Booth et. al (1997). The most significant adjustments concerning the COC-adjusted earnings relate to depreciation and the use of a special depreciation difference that can be applied in Finnish bookkeeping. The formula for calculating the COC-adjusted earnings is presented in Appendix 2.

[8] Yritystutkimusneuvottelukunta
[9] Elinkeinoelämäntutkimuslaitos
[10] Kaupparekisteri
[11] Patentti- ja rekisterihallitus

Compared to earlier studies the COC-adjusted earnings and published accounting earnings of the companies in my sample differ relatively little from each other. I have several explanations for this surprising observation in light of earlier returns earnings research in Finland. Firstly, the sample used in this study uses 27 companies which have been continuously listed on the Helsinki Stock Exchange main list between 1.4.1990-1.4.2002. Therefore, the sample is prone to survivorship bias and smaller and less profitable firms with more unstable earnings streams are likely to be excluded. Secondly, the Finnish Accounting Act was revised in a significant way in 1992 and major differences between IAS and Finnish accounting practices were either completely erased or substantially diminished. The combination of the revised accounting practices and the removal of restrictions on foreign shareholdings in Finland in 1993 was probably a strong incentive for larger companies to start targeting their financial information more internationally and the use of traditional visible earnings management methods has diminished as a result.

To test my hypothesis I have compared the earnings information of the sample companies in 1988-1992 with the descriptive statistics reported in Booth et al. (1997). Booth et al. (1997), using a sample of all Helsinki Stock Exchange main list companies and fiscal years 1989-1992, find that the mean ADJEAR (COC-adjusted earnings) figures differ significantly from zero using a t-test and a significance level of 5% whereas REPEAR (reported accounting earnings) figures do not. They attribute the difference to earnings management, which effectively means that Finnish companies smooth their income streams for tax purposes. Using the 27 companies in my sample I obtain similar results in certain respects. A t-test with a 5% significance level reveals that only the adjusted earnings in 1989 differ significantly from zero. However, using a paired t-test with a 5% confidence level to compare the means of ADJEAR and REPEAR between 1989-2001 reveals a significant difference between the two earnings measures only between 1989-1992. Thus, I believe that there is support for the hypothesis presented above as an explanation for the small difference in respect the two earnings measures considered. In the empirical part of the paper I will consequently only use reported earnings.

6. RESULTS

6.1 Descriptive Statistics for Regression Variables

Table 5 gives descriptive statistics of the basic regression variables that are used in the empirical part of the study. These regression variables are reported for 1993-2002, since this is the period that is used when ERCs are approximated using returns with and without leading periods later on in the paper. Yearly mean and median returns of the sample companies in 1993-2002 are closer to the mean returns of the HEX Portfolio Index (19,1%) than the HEX Main Index (34,9%) in the respective period as expected. The mean yearly return exceeds the median return, which is due to some extreme observations and the results are in this respect similar to those obtained with larger international samples [see e.g. Kothari (1992)]. The biggest yearly gain (207%) and loss (-71%) are both attributed to Raisio Yhtymä OYJ in years 1996-1997 and 1999-2000 respectively. However, these observations are not related to extreme observations in the other variable categories.

Table 5
Descriptive Statistics for Regression Variables

Variable	Mean	Std.dev.	Median	Q1	Q3	Min.	Max.
$(P_{it} - P_{it-1}) / P_{it-1}$	0.2673	0.5622	0.1645	-0.1278	0.5551	-0.7100	2.0700
$\Delta X_t / MV_{t-1}$	0.0290	0.2066	0.0105	-0.0196	0.0528	-1.5500	1.9700
X_t / MV_{t-1}	0.0719	0.1812	0.0785	0.0411	0.1253	-1.6800	0.9000

Notes: P is calculated inclusive of dividends and the effects of capital issues. The price is measured in the beginning of April in each sample year t and $(t-1)$ respectively. MV is market value calculated on the same dates as prices. X are the published total accounting earnings in financial year t. Observation between the period 1993-2002 are included, N=243 for each variable.

The extreme observations in the earnings difference relative to market value category can be attributed solely to Julius Tallberg OYJ (-155% in 1995-1996 and 197% in 1996-1997, respectively). Similarly the extreme observations in the price level deflated by market value category can be attributed to the same company in 1995-1997. The intuition that the largest price movements, especially gains, are generally mostly due to the firms in the telecommunication sector (Nokia OYJ, Tietoenator OYJ) is confirmed by manually looking at the observations.

6.2 Descriptive Statistics for Determinants Used to Explain Price Anticipation of Earnings

Market Value = MV_{it}

The market value of a company *i* at time *t* is used both in the independent variable as a deflator as well as an explanatory variable for the firm's information environment and consequently the price anticipation of earnings. The expectation is that market value proxies for size and that there is more value-relevant information available for investors about large firms. Market value is measured on the first trading day of April in each year *t* by calculating [number of outstanding shares*market price (EUR)[12]]. If a company has had two outstanding share series the price for the other series is either the market price or, in the case of non-listed shares, it is set as the same as the price for the listed series. Generally, the listed more traded share series for HEX Main List firms can be described as a 'B-share', which has had poorer voting rights as the often non-listed 'A-share'. The number of the more higher voting power 'A-shares' has been normally lower compared to the 'B-shares' (average of 43,1% for the sample companies that had two series in 1990 and 32,7% in 2001, respectively), which is the more widely traded series and consequently used in the return cumulation. The mean market value of the sample companies was € 298 501 955 on 2.4.1990, where as on 2.4.2002 it was € 5 291 621 608 (€ 571 053 747 excluding Nokia Oyj).

Trading Volume = 'TV'

Trading volume is calculated from the same share series, which is used to calculate the returns for each company. This is always the series that has counted for most of the trading (in total EUR) if the company has had two outstanding series, normally the so called 'B-share' (see Appendix 1 for details). Trading volume is measured as the total volume in EUR between the first trading day of April in year *t* and *(t+1)*. Prior to the lifting of restrictions on foreign share ownership in Finland (1993) firms had each share series divided into a 'restricted share', which was only available for trading to domestic investors, and an 'unrestricted share', which was available for trading to domestic and foreign investors. The legal upper bound for the portion of 'unrestricted shares' in a share series was limited to 20%. Prior to 1993 the 'restricted share' is therefore used for calculation of returns and trading volume, since it reflects the expectation of domestic investors versus Finnish accounting earnings [Hietala (1989)] and only the trading volume of the 'restricted share' will be coherently attributed to the price formation of the 'restricted share' as is done with different share

[12] 1 EUR = 5,94573 FIM

series. I was only able to extract exact trading figures in EUR a day per share series from 2.1.1998 onwards from the HEX-database. Prior to 1998 the trading volume in EUR each day is calculated as [number of shares traded*closing price], which induces a slight bias depending on the movements of the particular stock during the trading day. However, the bias is not regarded to be significant for the relevant use of this proxy.

The Strength of The Bank Relationship = 'Bank RS'

The strength of the bank relationship for a given firm in the sample is calculated from the annual financial statements as [loans from financial institutions/total shareholders' equity and liabilities]. It measures the amount of relationship capital for a given firm relative to 'arms-length financing'. Even though the actual measured amount is 'loans from financial institutions' the item in the annual accounts will practically represent outstanding loans from banks. Loans from insurance institutions

Table 6

Descriptives for Determinants Explaining Price Anticipation of Earnings, 1990-2001

	Market Value	Trading Volume	Bank RS*
Mean	440 902 511 €	144 733 518 €	0.2070
Median	299 218 425 €	35 507 884 €	0.1796
Std.dev.	497 609 744 €	296 824 336 €	0.1724
Q1	85 442 494 €	6 605 565 €	0.0542
Q3	621 955 729 €	192 567 662 €	0.3152
Max.	4 620 895 380 €	2 878 868 362 €	0.6881
Min.	824 205 €	20 701 €	0.0000
*N***	312	312	324

Notes: Market Value is counted on the first trading day of April in year t between 1990-2001. Trading Volume is counted between the first trading day of April in year t and year (t+1) in 1990-2001. Bank RS is counted as (loans from financial institutions/total shareholders' equity and liabilities) at the end of year (t-1) for year t between 1990-2001. *Bank RS = The strength of the bank relationship, ** N = number of observations, Nokia excluded from Market Value and Trading Volume as an outlier (gives a distorted view of the determinant amounts in EUR).

are mostly accumulated under the 'pension loans' item in Finnish bookkeeping and represent outstanding pension liabilities. The ratio for year *t* is calculated from the end of year *(t-1)* statements. In Finland, the mandatory reported components in financial statements for listed companies are guided by the Finnish Accounting Act, Accounting Regulations, the Companies Act, special regulation concerning listed firms and the recommendations of the Board of Chartered Accountants[13]. Currently, loans from financial institutions are shown separately under both long- and short-term liabilities either in the actual balance sheet or in the notes describing the individual

[13] Kirjanpitolautakunta

components of long- and short-term liabilities. Before the revision of the Accounting Act in 1992, only the loans from financial institutions belonging to long-term liabilities were shown individually and the short term loans from financial institutions fell under 'amortization of long-term liabilities' or 'other short-term loans'. Therefore, prior to 1992, only the loans from financial institutions under long-term liabilities are used in calculating the proxy because verifying the components of the short-term liabilities was not possible in a sufficiently reliable way. The individual rank order of companies based on The Strength of The Bank Relationship -ratio does not seem to differ a lot between 1993 and 1994, which was confirmed by finding a significant correlation. Actual data was collected from annual published financial statements found mostly on company websites and any missing statements were retrieved from the archives of the National Board of Patents and Registration (mostly pre-1993).

6.3 Correlation Between The Determinants

Table 7 depicts the correlation between the determinants used in explaining price anticipation of earnings. The Pearson correlation coefficients are significant in all three cases, displaying the fact that there is a linear relationship between the determinants. As could be expected, larger firms have larger trading volume, which is described by a very strong association between the two

Table 7

Pearson Correlation Coefficients Between the Determinants Used to Explain Price Anticipation of Earnings in 1990-2001

	Size	Trading Volume	Bank RS
Size	1	0.804**	-0.330**
Trading Volume		1	-0.246**
Bank RS			1

Notes: Size = ln (Market Value) in year *t*, Trading Volume = ln (Trading Volume) measured in EUR between *t* and *(t+1)* and Bank RS is (loans from financial institutions/total shareholders' equity and liabilities) at the end of year *t-1*. ** Pearson correlation coefficients significant at the 1% level (1-tailed).

determinants. It seems that there is a negative linear relationship between a firm's market value in a given year with the amount of relationship financing. The same applies for trading volume. This would imply that the three determinants explain the quality of a firm's informational environment in a fairly similar manner and that firms which have stronger ties with banks are typically smaller than other sample firms. The hypothesis was that the quality of a firm's informational environment would increase in tandem with size, the trading volume of its share and the amount of arms-length financing relative to relationship capital.

6.4 Returns Earnings Regressions

6.4.1 Pooled Regressions

Contemporaneous

Table 8 presents the parameters from a pooled regression for models D1 and L1, using return data from 1.4.1993 to 1.4.2002 and annual reported earnings data from 1993 to 2001, respectively. This effectively means that the parameters are estimated simultaneously for the whole sample and we do not allow for the ERC (β) to vary cross-sectionally or intertemporally. The regression equation follows the model derived in Chapter 4 where

$$(P_{it} - P_{it-1}) / P_{it-1} = \alpha + \beta \Delta X_{it} / MV_{it-1} + \varepsilon_{it} \qquad \text{(D1)}$$

$$(P_{it} - P_{it-1}) / P_{it-1} = \alpha + \beta X_{it} / MV_{it-1} + \varepsilon_{it} \qquad \text{(L1)}$$

Table 8

Pooled Contemporaneous ERC Regressions

$D1 = \quad (P_{it} - P_{it-1}) / P_{it-1} = \alpha + \beta \Delta X_{it} / MV_{it-1} + \varepsilon_{it}$

$L1 = \quad (P_{it} - P_{it-1}) / P_{it-1} = \alpha + \beta X_{it} / MV_{it-1} + \varepsilon_{it}$

	Total		**Only Profit**		**Outliers removed**	
	D1	*L1*	*D1*	*L1*	*D1*	*L1*
ERC	0.372*	0.096	0.638**	1.654**	0.704*	0.616*
Std.dev	0.174	0.200	0.218	0.373	0.290	0.334
R2	0.019	0.001	0.037	0.082	0.025	0.014
Adj.-R2	0.015	-0.003	0.033	0.078	0.020	0.010
N	243	243	222	222	235	235

Notes: ERC is the coefficient of the independent variable in a regression of the form outlined above, independent variable is either the difference in published accounting earnings (X) between years *t* and *t-1* for firm *i* deflated by market value in *t-1* (D1) or the level of earnings in year *t* for firm *i* deflated by market value in *t-1* (L1), P = stock price for firm *i* in year *t* or *t-1*. "Outliers removed" = extreme one percent small and large values of the regression variables are excluded when estimating regressions, * denotes significance at the 5% level, **denotes significance at the 1% level.

and the return cumulation is always started on the first trading day of April in year *t* and ended in the beginning of April the following year *t+1*. The independent variable, 'unexpected earnings', is either the change in accounting earnings between years *t* and *t-1* or the 'level' of accounting earnings in year *t* deflated by market value in the beginning of year *t*.

The results in Table 8 show the typical problem that is associated with contemporaneous returns earnings regressions, notably the R^2 and adjusted R^2 values for the models are fairly low. The goodness of fit falls below 10 % even when outliers are removed and is consistent with earlier research. Hayn (1995) presented empirical evidence backing the statement that investors consider losses as transitory earnings since they are not expected to continue indefinitely due to a shareholder liquidation option on the assets of the firm. As a result, it has become a standard to control for the effect of losses on the observed ERCs in the literature. The percentage share of losses amongst all earnings observations in the sample firms during the period 1993-2001 was only 8,97% (the respective figure for 1989-1992 is 28,87%). The small number of losses could be mostly explained by the economic growth trend that labelled the Finnish economy during the latter part of the 1990's following a severe recession in 1990-1992. The exclusion of losses improves the predictive power of the model, as expected. Martikainen et al. (1997) report an adjusted R^2 value of 8,1% for a regression of returns on the level and change of positive annual published accounting earnings for Finnish listed firms in 1974-1989 and my results are similar in this respect. However, the ERCs obtained are considerably larger, even if a regression including both variables (first difference and level of earnings as independents) is used similar to Martikainen et al. (1997). The results are interesting because Martikainen et al. (1997) test for the effect of firm size on the observed ERCs and find no difference between large and small firms. Therefore, even if the sample in this study suffers from survivorship bias, the results indicate that Finnish accounting earnings could have become more useful in explaining returns in a contemporaneous setting. However, following Johnson (1999) and her study associating business-cycles and ERCs one could argue that the 1990s economic boom explains the large ERC values. The predictive power of the contemporaneous model for both the difference and the level specification is enhanced when 1% extreme outliers of the regression variables are removed from the sample. One percent outliers are similarly controlled for in all the ERC tests that follow.

Intertemporal variation in contemporaneous ERCs

Martikainen and Ankelo (1990) have previously proved that ERCs vary intertemporally in Finland (they used annual return and earnings data for the period 1975-1985) as in other developed countries. Intertemporal variation in ERCs can be hypothesized to be related to some of the ERC determinants presented in Chapter 3 having a different effect in different time periods. Such factors could be e.g. interest rates [Collins and Kothari (1989)], earnings persistence [Kormendi and Lipe (1987)] and business-cycles [Johnson (1999)]. The ERCs of this study's sample will now be tested

to account for intertemporal variation. Contrary to the general prices leading earnings setting, which requires an equal amount of earnings observation for both the contemporaneous and leading period tests, in this section all of the annual ERCs between the period 1.4.1990-1.4.2002 (annual earnings observations from 1990 to 2001) can be tested. Contemporaneous ERCs using COC-adjusted earnings will be safe tested as well to search for a higher explanatory power in the regression models.

Table 9 demonstrates how the ERC estimates vary in the sample period for pooled annual regressions using either the difference in earnings (D1) or levels in earnings (L1) divided by market value as the independent variable. Using COC-adjusted total earnings did not result in higher ERCs

Table 9

Pooled Contemporaneous ERC Regressions in 1990-2001 and in Two Sample Sub-Periods

$$D1 = (P_{it} - P_{it-1}) / P_{it-1} = \alpha + \beta \Delta X_{it} / MV_{it-1} + \varepsilon_{it}$$

$$L1 = (P_{it} - P_{it-1}) / P_{it-1} = \alpha + \beta X_{it} / MV_{it-1} + \varepsilon_{it}$$

	1990-2001				1990-1995				1996-2001			
	Total		Outliers rem.		Total		Outliers rem.		Total		Outliers rem.	
	D1	*L1*	*D1*	*L1*	*D1*	*L1*	*D1*	*L1*	*D1*	*L1*	*D1*	*L1*
ERC	0.794**	0.244	1.044**	0.916**	0.847**	0.092	1.075**	0.314	0.503*	1.274**	0.791*	1.481**
Std.dev	0.089	0.142	0.234	0.231	0.103	0.177	0.302	0.252	0.214	0.342	0.382	0.414
R2	0.198	0.009	0.060	0.048	0.298	0.002	0.076	0.010	0.033	0.080	0.027	0.076
Adj.-R2	0.195	0.006	0.057	0.045	0.294	-0.005	0.070	0.004	0.027	0.074	0.020	0.070
N	324	324	312	312	162	162	157	157	162	162	158	158

Notes: ERC is the coefficient of the independent variable in an equation outlined above. Independent variable is either the difference in published accounting earnings (X) between years t and *t-1* for firm *i* deflated by market value in *t-1* (D1) or the level of earnings in year *t* for firm *i* deflated by market value in *t-1* (L1). P = stock price for firm *i* in year *t* or *t-1*. "Outliers rem." = extreme one percent small and large values of the regression variables are excluded when estimating regressions., N = number of regressions used to estimate the model, * denotes significance at the 5% level, **denotes significance at the 1% level.

or higher R^2s during the whole sample period or the two sub-periods. The sample period was broken into two halves because it conveniently gives us the same amount of regressions for both sub periods as well as differentiating between the boom-period of late 1990s and the low stock market activity and recession period of the early 1990s. The results show that the two specifications for the independent variable perform differently in the two sub periods. Using the difference in earnings seems to result in a higher explanatory power and higher ERCs in 1990-1995, while the same applies for the level in earnings specification in 1996-2001 (excluding extreme 1% outliers). However, since in the prices leading earnings part of the study the studied period ranges from 1993-

2001, these results demonstrate why the level specification seems to perform better in that setting. Additional tests on different time periods were run and when outliers were removed the change in earnings (D1) specification resulted in the highest adjusted R^2 value (20,4%) in 1990-1992. Yearly estimates are not reported here because of low number of observations (27).

Prices leading earnings

Next it will be tested whether we can increase the ERC in a pooled regression setting by adding returns to the dependent variable. Ideally, increased ERCs should provide evidence of prices leading earnings. Following the methodology of Donnelly and Walker (1995) the estimated equations are

$$(P_{it} - P_{it-\tau}) / P_{it-\tau} = \alpha + \beta(\Delta X_{it} / MV_{it-\tau}) + \varepsilon_{it} \qquad D\tau$$

$$(P_{it} - P_{it-\tau}) / P_{it-\tau} = \alpha + \beta(X_{it} / MV_{it-\tau}) + \varepsilon_{it} \qquad L\tau$$

Table 10

ERCs Estimated Using Leading Period Returns and Pooling the Observations

$D\tau$ = $(P_{it} - P_{it-\tau}) / P_{it-\tau} = \alpha + \beta(\Delta X_{it} / MV_{it-\tau}) + \varepsilon_{it}$ τ = 2,3,4

$L\tau$ = $(P_{it} - P_{it-\tau}) / P_{it-\tau} = \alpha + \beta(X_{it} / MV_{it-\tau}) + \varepsilon_{it}$ τ = 2,3,4

	Total		**Only Profit**		**Outliers removed**	
	D2	*L2*	*D2*	*L2*	*D2*	*L2*
ERC	1.514**	2.957**	1.808**	3.776**	1.006	2.862**
Std.dev	0.267	0.367	0.281	0.412	0.518	0.613
R2	0.118	0.212	0.159	0.276	0.016	0.086
adjR2	0.114	0.209	0.155	0.273	0.012	0.082
N	243	243	222	222	235	235
	D3	*L3*	*D3*	*L3*	*D3*	*L3*
ERC	0.474	3.243**	1.818*	6.419**	0.123	5.279**
Std.dev	0.502	0.680	0.793	1.044	0.763	0.784
R2	0.004	0.086	0.023	0.147	0.000	0.164
adjR2	0.000	0.083	0.019	0.143	-0.004	0.160
N	243	243	222	222	233	233
	D4	*L4*	*D4*	*L4*	*D4*	*L4*
ERC	1.331	6.413**	1.475	7.771**	0.719	5.929**
Std.dev	0.792	0.990	0.896	1.211	1.022	0.867
R2	0.012	0.148	0.012	0.158	0.002	0.167
adjR2	0.007	0.145	0.008	0.154	-0.002	0.163
N	243	243	222	222	235	235

Notes: ERC is the coefficient of the independent variable in a regression of the form outlined above, independent variable is either the difference in earnings between years t and (t-1) for firm i deflated by market value in year (t-2) [D2], (t-3) [D3], (t-4) [D4] or the level of earnings in year t deflated by market value in (t-2) [D2], (t-3) [D3], (t-4) [D4]. "Only Profit" = regression variables including negative earnings observations excluded, "Outliers removed" = extreme one percent small and large values of the regression variables are excluded when estimating regressions, N = number of regressions, * denotes significance at the 5% level, ** denotes significance at the 1% level. Overlapping returns are used when dependent variable uses leading year's returns.

where τ denotes the number of preceding periods for which returns are added to the dependent variable. E.g. L3 denotes a model where earnings level divided by market value in (t-3) is used as an independent variable and returns from (t-3) to t are cumulated in the dependent variable. The results of the regressions are reported in Table 10. As expected the ERCs increase when leading period returns are added to the dependent variable confirming the earlier observations that prices anticipate the change in earnings in year t before year t in Finland. The explanatory power of the models is relatively low, only the level specification for the whole sample with a year of leading period returns added results in an adjusted-R^2 of over 20%. This is probably due to the pooling of the regressions, which neglects the fact that ERCs vary cross-sectionally. However, the obtained ERCs are highly significant in 11 of the 18 models. The earnings change model seems to under perform the levels specification by more than expected and does not provide statistically significant results when leading period returns are added to estimate ERCs.

6.4.2 Firm-Specific Regressions

The empirical evidence in the returns earnings research field indicates that ERCs vary across industries and firms. Therefore, to obtain a better estimate of the price anticipation of earnings the regressions will next be performed on a firm level rather than pooling all the regressions together. The equations used are

$$(P_{it} - P_{it-1}) / P_{it-1} = \alpha_i + \beta_i (UX_{it} / MV_{it-1}) + \varepsilon_i \qquad \text{(D1/L1)}$$

$$(P_{it} - P_{it-2}) / P_{it-2} = \alpha_i + \beta_i (UX_{it} / MV_{it-2}) + \varepsilon_i \qquad \text{(D2/L2)}$$

$$(P_{it} - P_{it-3}) / P_{it-3} = \alpha_i + \beta_i (UX_{it} / MV_{it-3}) + \varepsilon_i \qquad \text{(D3/L3)}$$

$$(P_{it} - P_{it-4}) / P_{it-4} = \alpha_i + \beta_i (UX_{it} / MV_{it-4}) + \varepsilon_i \qquad \text{(D4/L4)}$$

where

$$UX_{it} = \Delta X_{it} \qquad D\tau$$

or

$$UX_{it} = X_{it} \qquad L\tau$$

similarly to the previous section. The difference relative to the approach in Table 10 is that now we obtain a ERC denoted (β_i) rather than (β). Thus, the obtained ERC (β_i) is a measure of firm i's

Table 11

ERCs and Explanatory Power of Leading Period Regression Models Allowing for Cross-Sectional Variation

$D\tau = (P_{it} - P_{it-\tau}) / P_{it-\tau} = \sum \alpha_i \lambda_i + \sum \beta_i \lambda_i (\Delta X_{it} / MV_{it-\tau}) + \varepsilon_{it}$ $\tau = 1,2,3,4$

$L\tau = (P_{it} - P_{it-\tau}) / P_{it-\tau} = \sum \alpha_i \lambda_i + \sum \beta_i \lambda_i (X_{it} / MV_{it-\tau}) + \varepsilon_{it}$ $\tau = 1,2,3,4$

Adjusted R2 Estimates

	D1	L1	D2	L2	D3	L3	D4	L4
Mean	0.062	0.151	0.158	0.319	-0.004	0.264	0.022	0.392
Median	-0.024	0.130	0.149	0.302	-0.055	0.270	-0.054	0.409
Std.dev	0.198	0.241	0.277	0.340	0.155	0.277	0.199	0.308
Max	0.420	0.675	0.933	0.968	0.392	0.836	0.536	0.938
Min	-0.143	-0.143	-0.143	-0.143	-0.142	-0.130	-0.143	-0.111

ERC Estimates

	D1	L1	D2	L2	D3	L3	D4	L4
Mean	2.447	3.786	4.623	6.595	4.902	8.072	5.207	7.799
Median	1.489	2.829	2.791	5.057	1.497	5.286	1.376	5.886
Std.dev.	4.160	5.251	6.826	6.951	12.355	11.150	13.393	9.550
Max	15.239	20.460	27.009	26.963	60.513	53.705	67.572	43.221
Min	-3.215	-3.632	-4.632	-1.217	-3.115	-0.185	-3.340	-0.654

Notes: Firm-specific regressions outlined above are used to estimate ERCs and R2 values for each individual firm and the summary results are reported here, ERC is the coefficient of the independent variable which is either the difference in earnings between years t and (t-1) for firm i deflated by market value in year (t-2) [D2], (t-3) [D3], (t-4) [D4] or the level of earnings in year t deflated by market value in (t-2) [D2], (t-3) [D3], (t-4) [D4].Overlapping returns are used when leading year's returns are included in the dependent variable, first year of earnings observation is 1993 and the last 2001, all 27 sample firms included.

returns sensitivity to its earnings and Table 11 demonstrates how allowing for cross-sectional variation improves the ERCs and R^2s when mean and median values of firm-specific regressions are reported. Small sample size is effectively a factor since there are only 27 individual firms used in the empirical part of the study and therefore the standard deviations of both adjusted R^2 estimates and ERCs are quite large. Even controlling for firm-specific difference does not change the fact that the change in earnings ($D\tau$) specification seems to perform very poorly among the sample. The goodness of fit using the level of earnings ($L\tau$) specification is approximately 40% for both the median and mean observation when leading year returns of up to four years are added to the dependent variable and is closer to values that one could expect to obtain [see e.g. Donnelly (1998) for UK companies and Kothari and Sloan (1992) for US evidence].

Both methods used to test for the effect of including leading period returns in the dependent variable seem to indicate that most of the information arrives in the market inside three previous years of the actual announcement of reported accounting earnings for a given year. The reason for such an observation may be analysts' earnings forecast window, which guides the pricing of the share prices in the market and could indicate the period for which forward looking firm specific information is 'collected'. Piippo (2002) studied analyst flowing in Finland and covered Earnings per Share (EPS) forecast horizon for HEX listed firms that had at least a forecast available for year t in the I/B/E/S database during 1990-2000 [number of analysts observations used to derive one EPS forecast is not reported in Piippo (2002)]. The percentage of firms that have a t+2 EPS forecast available in 1990 is 3,1% while none have a forecast extending to t+3 available. In the middle of the period, 1995, already 59,6% of the firms have a t+2 forecast in the database while only 14,5% have a t+3 forecast available. In 2000, 93,2% of the firms have a forward looking EPS estimate reaching to period t+2 while t+3 estimates are available to 43,6% of the firms (although the amount of t+3 estimates in 1999 was still as low as 8,6%). Therefore, during the research period of this study, 1990-2002, analysts in Finland have tended to forecast earnings only as far as t+2 during financial year t. If prices imbed the information in analysts' earnings forecast as well as other value-relevant information in a logical manner, we should not evidence a large increase in the ERC in a design using leading period returns when the return over three years prior to the earnings announcement is added. Thus, it would offer an explanation for the results in Table 11 as well as Table 10.

6.5 Interpretation of Observed ERCs

The ERCs approximated in sections 6.4 should be assessed against ERC values that one would expect to obtain by considering the underlying valuation models and investors' expected rate of return on the Finnish stock market. The historical risk premium in Finland has been approximately the same as in other international stock markets, that is between six and seven percent[14]. When the risk premium is added to the risk-free interest rate we get the expected rate of return on equity, which would based on a historical expectation be around (4%+6%/7%) 10 and 11 percent. This is close to the mean return of the HEX-Portfolio Index during the sample period. As discussed in Chapter 4, the observed ERCs can be expected to be around 1+1/r, where r is the expected rate of return on equity, based on the underlying earnings valuation model. Therefore, based on historical

[14] The Development From National Capital Markets to A Global Marketplace – HEX 90 years; Särömaa Maija, Kauko Hanna; HEX publications 2002.

returns, the coefficient between earnings and returns should be approximately 10,09-11 [(1+1/0,11)-(1+1/0,10)].

Looking at historical returns can be an inaccurate way of estimating the expected rate of return during the sample period. A recent survey[15] demonstrates that the risk premium demanded on equity by investors is becoming increasingly smaller. When asked about their opinion on the risk premium in the Finnish stock markets, the analysts of Finnish investment banks, investment funds and insurance companies gave a mean answer of 6,4% in 1999 and 5,3% in 2000. Therefore, one could expect the ERCs to be even larger in the markets using recent data. Another reason for the apparent difficulty of using historical returns to predict the sample ERCs is that the sample firms do not represent all of the HEX Main List firms, but the sample was prone to survivorship bias.

To summarize, assessing the expected ERC magnitudes of the sample and comparing these values to the observed results is a complex task. As well as assessing the market's risk premium, one should consider the fluctuation in the risk-free interest rate, which depending on the bench mark used has been below 4% for most of the 1990s. The only fairly sure deduction one can make based on the ERCs obtained by using either the pooling method or allowing for cross-sectional variation is that the ERCs are constantly below the values one could expect to obtain (maximum mean value of 8,072 when using the level of earnings as the independent variable and allowing for cross-sectional variation). This is consistent with international findings [see e.g. Kothari and Sloan (1992) for US evidence].

6.6 Prices Leading Earnings: Effect of Determinants

Hypotheses to be tested

In the next section, the effect of the determinants outlined in the hypotheses on prices leading earnings is tested. The hypotheses derived in Chapter 3 were

H1: Price anticipation of earnings is positively related to firm size proxied by market value.

H2: Price anticipation of earnings is positively related to the amount of trading volume (EUR) in a share.

---

[15] Osakkeiden markkinariskipreemio Suomessa; PricewaterhouseCoopers 2000.

H3: Price anticipation of earnings is negatively related to the strength of the bank relationship.

The methodology that is used to illustrate the differences in price anticipation of earnings is based on Donnelly (1998). A regression of the following form is estimated to differentiate between the firms that are described to have the characteristics most strongly associated with price anticipation of earnings and the other firms in the sample relating to each hypothesis

$$(P_{it} - P_{it-\tau}) / P_{it-\tau} = \alpha + \beta_1 (X_{it} / MV_{it-\tau}) + \beta_2 \lambda_{it} (X_{it} / MV_{it-\tau}) + \varepsilon_{it} \quad (32)$$

Because we earlier established that the 'change' in earnings model performed poorly when leading period returns were added to the dependent variable the 'level' model is used in this section to illustrate cross-sectional differences in price anticipation of earnings. In equation 32 the firms that are included in a certain control group will be given a dummy (λ_{it}) value of 1 and the rest of the sample will be given a dummy value of 0. As a result, the coefficient β_2 will estimate the difference between the ERC of the firms in the control group and the other firms in the sample for the particular model estimated (L1, L2, L3, L4 depending on the amount of previous years' returns included in the dependent variable). E.g. when testing for the effect of size, the smallest firms in the sample are given a dummy value of 1 and β_2 will estimate the difference between the ERC of small firms and other firms in the sample when leading period returns are added to the model.

To test for the effect of each determinant on price anticipation of earnings it is necessary to define the 'extreme' control group which is then compared to the rest of the sample. The small number of firms in the sample means that the control group can not be too extreme since this would result in a small number of observations to approximate the control group ERC (smallest or largest 10% would only include 3 firms). Consequently, the control group size is set at 25% and the firms are ranked each year in term of the determinant to be tested to establish which will be given a dummy of 1 to test for the difference in ERC. E.g. when testing for the effect of size the small firm control group, the firms that will be given a dummy value of 1 in equation X, will include the firms that are ranked numbers 21 to 27 in year t based on their market value (rank of 1 is given for the largest observation and 27 for the smallest). Because the control group is based on a subjective choice the results were also confirmed by running robustness checks using other control group sizes. Namely, the control group is varied by each in turn including between five and nine firms (18,5%-33,3% of

all firms). The obtained results were similar to those run by using seven firms in the control group and confirm that the reported results are not subject to the choice of the magnitude of the control group.

In section 6.6 another approach is used to demonstrate the effect of the hypothesized determinants to the cross-sectional differences in price anticipation of earnings. The correlation between the change in ERC for each firm when leading years' returns are added to the dependent variable and the absolute magnitude of the determinants hypothesized to be related to the ability of prices to lead earnings are measured. The strength of this approach is that we can use the natural logarithms of the absolute values rather than relying on a dummy approach.

Other methodologies to test for the ability of the determinants to explain variation in price anticipation of earnings were also explored. The idea was to find an empirical design that would be close to the dummy design outlined previously but would include the absolute value of size, trading volume and the strength of the bank relationship on the right hand side of the equation. This would make the results even more reliable and simpler to interpret. However, designing an equation to meet this purpose proved to be difficult and during the research I was unable to come up with logical results using alternative methods to the dummy approach. Contrary to the more typical studies in the finance or accounting research field which are interested in explaining the returns (left hand side) relating to an event or observation by a significant explanatory variable (right hand side), the ERC studies are characterized by an interest in the absolute value of the relation. Therefore, adding explanatory variables to the right hand side of the equation result in explaining the returns, not the actual coefficient that we are interested in an ERC setting.

6.6.1 Size

It was earlier hypothesised that investors would have more information available about large firms compared to small firms, i.e. large firms would have a richer information environment. Thus, share prices of large firms should have a better ability to anticipate earnings compared to other firms. On the other hand, following the same logic, the prices of small firms should anticipate earnings to a lesser extent than those of other firms and small firms should have smaller leading period ERCs. Also, small firms should have larger contemporaneous ERCs as investors learn more about their value relevant events closer to the release of the accounting earnings.

The effect of size is tested by ranking the sample companies (1 is the value for the largest and 27 for the smallest) in terms of their market value (EUR) in the beginning of April in each year t between 1993-2001. The companies that fall into the smallest 25% (7/27 companies) of the sample each year are given a dummy value (λS_{it}) of 1 in the regression equation 33 and the rest are given a dummy value of 0. It follows that the coefficient (β_2) in equation 33 will then estimate the difference between the ERC of small firms and the other firms in the sample. Table 12 shows that the obtained ERCs support the hypothesis of small firms having smaller ERCs when leading period returns are added. Likewise, the contemporaneous returns seem to be higher for smaller firms than for the rest of the sample. Both ERCs obtained are significant in models L3

$$(P_{it} - P_{it-\tau}) / P_{it-\tau} = \alpha + \beta_1 (X_{it} / MV_{it-\tau}) + \beta_2 \lambda S_{it} (X_{it} / MV_{it-\tau}) + \varepsilon_{it} \qquad (33)$$

and L4, which would mean that the difference in price anticipation based on firm size is the highest three and four years before the earnings reported for period t. The goodness of fit of the model improves somewhat on the basic pooled sample, illustrating the benefits of differentiating between small firms and the rest of the sample. The same test as the one for the 25% small firms was also

Table 12

The Effect of Size on The ERC Estimates Using Leading Period Returns

$L\tau = (P_{it} - P_{it-\tau}) / P_{it-\tau} = \alpha + \beta_1 (X_{it} / MV_{it-\tau}) + \beta_2 \lambda S_{it} (X_{it} / MV_{it-\tau}) + \varepsilon_{it}$ $\tau = 1,2,3,4$

$\lambda S_{it} = 1$ if the market value of company i's equity capital in the beginning of April in year t is in the smallest 25% of the sample (and 0 otherwise)

Model	β_1	β_2	Adj.R^2
L1	0.322	0.741	0.014
L2	3.393**	-1.665	0.089
L3	6.759**	-3.848**	0.194
L4	7.765**	-4.890**	0.207

Notes: Model L1 indicates a regression which uses contemporaneous returns regressed on the level of earnings in year t, L2 indicates a model which uses contemporaneuos returns and one year of leading returns regressed on the level of earnings in year t, L3 and L4 are constructed similarly. Rankings are constructed yearly for period 1993-2001. ** denotes statistical significance at the 1% level. Extreme one percent small and large values of the regression variables are excluded when estimating regressions. Overlapping returns are used when leading year's returns are included in the dependent variable. All 27 sample firms included (235 regressions).

run on the 25% largest firms to study whether the phenomenon would be as strong in the other extreme group. However, no strong statistical evidence was found although the sign of the dummy ERC was positive when leading period returns were added as could be predicted by the hypothesis.

Another control test was run to take into account the years prior to 1993, namely 1990-1992. Some of the price formation information could be argued to have been "lost" by using the rankings starting from 1993. Therefore, a mean ranking based on size between 1990-2001 was constructed from the sample firms and similar test as in Table 12 was run to determine whether this method would better explain the price anticipation of earnings. The result from the model were worse in terms of explanatory power (R^2) than the ones reported in Table 12.

Size: Excluding investment firms

During the estimation of the effect of size on the magnitude of the ERC when leading period returns are added it was detected that the three firms classified as belonging to the 'Investment' group based on industry were included in the smallest 25% of the companies during the whole sample period. It was essential to test whether the exclusion of these firms would have an effect on the results for two reasons. Firstly, it was earlier determined that allowing for cross-sectional variation improves the ERCs in the sample group and an overweight of a certain industry in the control group

Table 13

The Effect of Size on The ERC Estimates Using Leading Period Returns, Excluding Investment Firms

$$L\tau = (P_{it} - P_{it-\tau}) / P_{it-\tau} = \alpha + \beta_1 (X_{it} / MV_{it-\tau}) + \beta_2 \lambda S_{it} (X_{it} / MV_{it-\tau}) + \varepsilon_{it} \qquad \tau = 1,2,3,4$$

$\lambda S_{it} = 1$ if the market value of company i's equity capital in the beginning of April in year t is in the smallest 25% of the sample (and 0 otherwise)

Model	β_1	β_2	Adj.R^2
L1	1.182*	0.757	0.054
L2	3.769**	-0.563	0.089
L3	6.609**	-1.139	0.177
L4	9.226**	-2.632	0.222

Notes: Model L1 indicates a regression which uses contemporaneous returns regressed on the level of earnings in year t, L2 indicates a model which uses contemporaneuos returns and one year of leading returns regressed on the level of earnings in year t, L3 and L4 are constructed similarly. Rankings are constructed yearly for period 1993-2001. * denotes statistical significance at the 5% level, ** denotes statistical significance at the 1% level. Extreme one percent small and large values of the regression variables are excluded when estimating regressions. Overlapping returns are used when leading year's returns are included in the dependent variable. 24 sample firms included (investent firms excluded, 216 regressions).

could bias the results. Secondly, the investment firms in question are mostly companies that invest in property and they have been forced to perform write-downs during the first half of the 1990's and to frequently report losses which could dampen the ERCs (Hayn 1995). Thirdly, Kasanen and Puttonen (1994), when studying investor relations of Finnish listed companies in 1994 using a

questionnaire sent to members of the Finnish Analyst Association, strongly criticized the investor relations of real estate investment firms in terms of quantity, reliability and clearness of communication. All of the factors are likely to explain some of the perceived "low quality" information environment of firms categorized as belonging to the Investment group by industry.

Table 13 depicts the results obtained by using a sample of 24 companies, excluding investment firms, and taking the ones that are included in the smallest 25% (6/24) of the sample by a yearly ranking. The results are qualitatively similar as in the test including all of the 27 sample firms. However, the β_2 values are not significant which could be a sign of the investment firms biasing the results when the whole set of sample companies are used.

6.6.2 Trading Volume

The second hypothesis to be tested in relation to price anticipation of earnings is the effect of trading volume. Prior evidence in the literature and intuition suggests that the richness of a firm's information environment could be linked to the amount of shares traded, large trading volume would consequently lead to a more efficient pricing process. Firms registering a high trading volume for their share series would then have a larger ERC when leading period returns are added and firms with low trading volume would have larger contemporaneous ERCs.

Table 14

The Effect of Trading Volume on The ERC Estimates Using Leading Period Returns

$$L\tau = (P_{it} - P_{it-\tau}) / P_{it-\tau} = \alpha + \beta_1 (X_{it} / MV_{it-\tau}) + \beta_2 \lambda T_{it} (X_{it} / MV_{it-\tau}) + \varepsilon_{it} \qquad \tau = 1,2,3,4$$

$\lambda T_{it} = 1$ if the company is ranked in the smallest 25% of the sample in terms of trading volume (EUR) in year [t,(t+1)] in relation to its more widely traded share series (and 0 otherwise)

Model	β_1	β_2	Adj. R^2
L1	0.300	0.823	0.015
L2	3.404**	-1.807	0.090
L3	6.754**	-3.960**	0.193
L4	7.083**	-3.831**	0.186

Notes: Model L1 indicates a regression which uses contemporaneous returns regressed on the level of earnings in year t, L2 indicates a model which uses contemporaneuos returns and one year of leading returns regressed on the level of earnings in year t, L3 and L4 are constructed similarly. Rankings are constructed yearly for period 1993-2001. ** denotes statistical significance at the 1% level. Extreme one percent small and large values of the regression variables are excluded when estimating regressions. Overlapping returns are used when leading year's returns are included in the dependent variable. All 27 sample firms included (235 regressions).

The effect of trading volume on the ability of prices to lead earnings is tested with similar methodology as that for size earlier. The sample firms are ranked in the beginning of April in each year from 1993 until 2001 according to their trading volume in EUR in the particular year [t, (t+1)]. E.g. for 1995 the ranking is based on the volume of trade (EUR) in the share series used in the return calculation between 1.4.1995 and 1.4.1996. This is effectively the same time period over which the contemporaneous ERC is measured (e.g. L1). The firms which are ranked in the smallest 25% of the sample based on trading volume in EUR are given a dummy (λT_{it}) of 1 in equation 34 and the rest of the sample firms are given a dummy of 0.

$$(P_{it} - P_{it-\tau}) / P_{it-\tau} = \alpha + \beta_1 (X_{it} / MV_{it-\tau}) + \beta_2 \lambda T_{it} (X_{it} / MV_{it-\tau}) + \varepsilon_{it} \quad (34)$$

The results obtained can be seen in Table 14. Again the sign of the ERCs measured are coherent with the expectations of trading volume explaining the richness of a firm's information environment, i.e. β_2 is positive for the contemporaneous model but negative for the models which include leading period returns. The price anticipation of earnings seems to be statistically significantly weak three and four years prior to the announcement of earnings in year t for shares that are thinly traded in terms of total EUR. The goodness of fit (R^2) is fairly similar to that obtained when size was used as a determinant to measure its effect on the price anticipation of earnings. A control test was run to determine whether there was a similar effect on the ERC using the 25% of firms with the highest trading volume in terms of EUR each year but no statistically significant results were obtained. A second control test was run by using the mean ranking of firms between 1990-2001 using total trading volume in EUR but the results were worse in terms of the explanatory power of the model (R^2).

Trading volume: Excluding investment firms

As with the estimation of size a large part of the regressions (67% of all "Investment" firm observations) attributed to the "Investment" firms based on the industry classification were included in the control group of 25% smallest companies in terms of total trading volume in EUR. Therefore, similarly to the case of size, it was tested whether the results would materially differ by excluding the "Investment" firms from the sample and re-running the tests with the remaining 24 firms (6/24 in the control group). As can be seen from Table 15, the results of excluding the "Investment" firms

from the estimation model results in qualitatively similar ERCs as the one for the whole sample. The (β_2) values for models L3 and L4 are statistically significant at the 5% level which could imply that trading volume is a stronger determinant for explaining price anticipation of earnings than market value. The goodness of fit (R^2) also improves over the initial model including all the sample firms, notably for the contemporaneous model and for the model including three years of leading returns.

Table 15

The Effect of Trading Volume on the ERC Estimates Using Leading Period Returns, Excluding Investment Firms

$L\tau = (P_{it} - P_{it-\tau}) / P_{it-\tau} = \alpha + \beta_1 (X_{it} / MV_{it-\tau}) + \beta_2 \lambda T_{it} (X_{it} / MV_{it-\tau}) + \varepsilon_{it}$ $\tau = 1,2,3,4$

$\lambda T_{it} = 1$ if the company is ranked in the smallest 25% of the sample in terms of trading volume (EUR) in year [t,(t+1)] in relation to its more widely traded share series (and 0 otherwise)

Model	β_1	β_2	Adj.R^2
L1	1.381**	0.231	0.049
L2	3.955**	-1.207	0.092
L3	7.125**	-3.209*	0.192
L4	9.315**	-4.275*	0.232

Notes: Model L1 indicates a regression which uses contemporaneous returns regressed on the level of earnings in year t, L2 indicates a model which uses contemporaneuos returns and one year of leading returns regressed on the level of earnings in year t, L3 and L4 are constructed similarly. Rankings are constructed yearly for period 1993-2001. * denotes statistical significance at the 5% level, ** denotes statistical significance at the 1% level. Extreme one percent small and large values of the regression variables are excluded when estimating regressions. Overlapping returns are used when leading year's returns are included in the dependent variable. 24 sample firms included (investent firms excluded, 216 regressions).

6.6.3 The Strength of The Bank Relationship

Based on e.g. Seppänen (1999), it was earlier hypothesised that in Finland the firms with a higher portion of relationship financing relative to assets will have lower incentives to provide timely value-relevant public disclosure because of their close working relations with the main source of capital. In a prices leading earnings setting this should mean that firms with a higher portion of bank debt would have a higher contemporaneous ERC and lower ERCs when leading period returns are added. Sample firms are ranked by using the Bank RS proxy (loans from financial institutions/total shareholders' equity and liabilities) at the end of each year (t-1) and the highest or lowest 25% of the observations in are given a dummy of 1 (λB_{it}) in year t and the rest 0 in the following equation (35)

$$(P_{it} - P_{it-\tau}) / P_{it-\tau} = \alpha + \beta_1 (X_{it} / MV_{it-\tau}) + \beta_2 \lambda B_{it} (X_{it} / MV_{it-\tau}) + \varepsilon_{it} \quad (35)$$

Table 16 shows that the association is of the same sign as expected for firms that can be characterised as having a strong bank relationship, i.e. prices do not seem to anticipate earnings as well for these firms as for the rest of the sample. The (β_2) values are highly significant when leading period return cumulation is started two or three years before the release of the actual accounting earnings. The same test was run by giving the sample companies an average rank based on their individual rankings between 1989-2000, but the results were very similar to those in Table 16 and thus not reported here.

Table 16

The Effect of the Strength of the Bank Relationship on ERC Estimates Using Leading Period Returns (strong ties)

$L\tau =$ $(P_{it} - P_{it-\tau}) / P_{it-\tau} = \alpha + \beta_1 (X_{it} / MV_{it-\tau}) + \beta_2 \lambda B_{it} (X_{it} / MV_{it-\tau}) + \varepsilon_{it}$ $\tau = 1,2,3,4$

$\lambda B_{it} = 1$ if the company is ranked in the highest 25% of the sample in terms of (loans from financial institutions/total shareholders' equity and liabilities) at the end of year t-1

Model	β_1	β_2	Adj.R^2
L1	0.519	0.227	0.007
L2	3.249**	-1.304	0.084
L3	7.032**	-4.157**	0.197
L4	7.651**	-5.186**	0.207

Notes: Model L1 indicates a regression which uses contemporaneous returns regressed on the level of earnings in year t, L2 indicates a model which uses contemporaneuos returns and one year of leading returns regressed on the level of earnings in year t, L3 and L4 are constructed similarly. Rankings are constructed yearly for period 1993-2001. ** denotes statistical significance at the 1% level. Extreme one percent small and large values of the regression variables are excluded when estimating regressions. Overlapping returns are used when leading year's returns are included in the dependent variable. All 27 sample firms included (235 regressions).

Contrary to size and trading volume, the Bank RS proxy seems to have high explanatory power also in the other extreme group. Table 17 shows how changing the dummy to include the 25% of the firms that had the lowest amount of loans from financial institutions each year have significantly higher ERCs when leading period returns are added to the dependent variable. Therefore, based on the results, firms' having a low amount of relationship capital seem to have a significantly higher quality information environment compared to the other firms in the sample.

Table 17

The Effect of the Strength of the Bank Relationship on ERC Estimates Using Leading Period Returns (weak ties)

$L\tau = (P_{it} - P_{it-\tau})/P_{it-\tau} = \alpha + \beta_1(X_{it}/MV_{it-\tau}) + \beta_2\lambda B_{it}(X_{it}/MV_{it-\tau}) + \varepsilon_{it}$ $\tau = 1,2,3,4$

$\lambda B_{it} = 1$ if the company is ranked in the lowest 25% of the sample in terms of (loans from financial institutions/total shareholders' equity and liabilities) at the end of year t-1

Model	β_1	β_2	Adj.R^2
L1	0.690	-0.325	0.007
L2	2.555**	1.175	0.083
L3	3.952**	5.411**	0.226
L4	4.900**	4.910**	0.201

Notes: Model L1 indicates a regression which uses contemporaneous returns regressed on the level of earnings in year t, L2 indicates a model which uses contemporaneuos returns and one year of leading returns regressed on the level of earnings in year t, L3 and L4 are constructed similarly. Rankings are constructed yearly for period 1993-2001. ** denotes statistical significance at the 1% level. Extreme one percent small and large values of the regression variables are excluded when estimating regressions. Overlapping returns are used when leading year's returns are included in the dependent variable. All 27 sample firms included (235 regressions).

The Strength of the Bank Relationship: excluding investment firms

As with the other determinants, it is important to control for the investment firms that are frequently present in the extreme dummy groups. Table 18 shows that the results practically stay the same as

Table 18

The Effect of the Strength of the Bank Relationship on ERC Estimates Using Leading Period Returns, Excluding Investment Firms (strong ties)

$L\tau = (P_{it} - P_{it-\tau})/P_{it-\tau} = \alpha + \beta_1(X_{it}/MV_{it-\tau}) + \beta_2\lambda B_{it}(X_{it}/MV_{it-\tau}) + \varepsilon_{it}$ $\tau = 1,2,3,4$

$\lambda B_{it} = 1$ if the company is ranked in the highest 25% of the sample in terms of (loans from financial institutions/total shareholders' equity and liabilities) at the end of year t-1

Model	β_1	β_2	Adj.R^2
L1	0.290	0.946	0.021
L2	3.439	-0.911	0.084
L3	8.047**	-4.575**	0.214
L4	8.847**	-4.518**	0.214

Notes: Model L1 indicates a regression which uses contemporaneous returns regressed on the level of earnings in year t, L2 indicates a model which uses contemporaneuos returns and one year of leading returns regressed on the level of earnings in year t, L3 and L4 are constructed similarly. Rankings are constructed yearly for period 1993-2001. ** denotes statistical significance at the 1% level. Extreme one percent small and large values of the regression variables are excluded when estimating regressions. Overlapping returns are used when leading years' returns are included in the dependent variable. 24 sample firms included (investent firms excluded, 216 regressions).

when the whole sample was used. Therefore, the strongest explanatory variable for the quality of the information environment among the sample firms seems to be the amount of bank finance relative to total shareholders' equity and liabilities

The most important finding relative to the Bank RS proxy seems to be that it performs well in both extreme groups even when controlling for investment firms (see Table 19). Thus, it seems that listed companies with a relatively low amount of bank finance are more dependent on efficiently priced arms-length capital and give more emphasise on providing investors with timely value-relevant disclosure and enhancing their information environment. It is also possible that these companies access the capital market more often to e.g. raise equity capital and therefore supply investors with more information on a continuous basis.

Table 19

The Effect of The Strength of The Bank Relationship on ERC Estimates Using Leading Period Returns, Excluding Investment Firms (weak ties)

$L\tau = (P_{it} - P_{it-\tau}) / P_{it-\tau} = \alpha + \beta_1 (X_{it} / MV_{it-\tau}) + \beta_2 \lambda B_{it} (X_{it} / MV_{it-\tau}) + \varepsilon_{it}$ $\tau = 1,2,3,4$

$\lambda B_{it} = 1$ if the company is ranked in the lowest 25% of the sample in terms of (loans from financial institutions/total shareholders equity&liabilities) at the end of year t-1

Model	β_1	β_2	Adj.R^2
L1	0.866*	-0.633	0.014
L2	2.816**	1.421	0.087
L3	4.605**	7.362**	0.276
L4	5.938**	7.616**	0.257

Notes: Model L1 indicates a regression which uses contemporaneous returns regressed on the level of earnings in year t, L2 indicates a model which uses contemporaneuos returns and one year of leading returns regressed on the level of earnings in year t, L3 and L4 are constructed similarly. Rankings are constructed yearly for period 1993-2001. * denotes statistical significance at the 5% level, ** denotes statistical significance at the 1% level. Extreme one percent small and large values of the regression variables are excluded when estimating regressions. Overlapping returns are used when leading years' returns are included in the dependent variable. 24 sample firms included (investent firms excluded, 216 regressions).

6.7 Multiple Regressions

The next step is to include all of the determinants in the model to see, which is the most important in explaining price anticipation of earnings. Equation 36 was estimated to get a simultaneous estimate of the predictive power of β_2, β_3 and β_4. As before the dummies were specified so that

$$(P_{it} - P_{it-\tau}) / P_{it-\tau} = \alpha + \beta_1 (X_{it} / MV_{it-\tau}) + \beta_2 \lambda S_{it} (X_{it} / MV_{it-\tau}) + \beta_3 \lambda T_{it} (X_{it} / MV_{it-\tau}) + \beta_4 \lambda B_{it} (X_{it} / MV_{it-\tau}) + \varepsilon_{it} \quad (36)$$

λS_{it} was one (and 0 otherwise) for the firms belonging to the smallest 25% of the firms based on yearly rankings in terms of market size between 1993-2001. Similarly, λT_{it} was specified as one (and 0 otherwise) for firms belonging to the smallest 25% of the firms based on yearly rankings in terms of total yearly trading volume in EUR between [(1993-1994),…,(2001-2002)]. The strength of the bank relationship dummy (λB_{it}) was estimated by first giving a dummy of one (and 0 otherwise) to the 25% of the firms belonging to the lowest sub group based on yearly rankings of [loans from financial institutions/total shareholders' equity and liabilities] and then re-estimating the equation using the ones that had the most relationship capital based on the same ranking.

The problem with the multiple regression approach was that as Table 7 depicts, especially size and trading volume are highly correlated. Because of a low sample size, this means that similar dummy values tend to be given to same firms in a given sample year and the model suffers from multicollinearity. Therefore, when estimating equation 36 the trading volume ERC (β_3) was insignificant although it has significant predictive power when used separately and the results are not very fruitful. When size or trading volume was left out of the regression equation 36, the model gave results that were very similar in terms of ERC magnitudes as those reported for the determinants individually. Highest explanatory power (model L4, extreme one percent outliers of regression variables excluded, adj. R^2 of 25,2%) was obtained with a model that included a dummy value of one (λS_{it}) for the smallest 25% of the sample firms based on yearly rankings of market value between 1993-2001 and a dummy value of one (λB_{it}) for firms belonging to the 25% sub group with the lowest amount of relationship capital based on yearly rankings between 1993-2001. All in all, the predictive power of the multiple regressions did not improve substantially compared to the tests which included only a single determinant and the ERCs were of similar magnitude and sign.

6.8 Correlation of Change in ERC With Size, Trading Volume and The Strength of The Bank Relationship

Apart from the dummy methodology used to test for the significance of size, trading volume and the strength of the bank relationship for price anticipation of earnings, we can test for the correlation of change in the ERC (ΔERC) and the determinants. The ERCs for each firm are measured between 1993 and 2001, with and without leading period returns, using both the change in earnings and earnings level as the independent variable. The estimated regressions are

$$(P_{it} - P_{it-\tau}) / P_{it-\tau} = \alpha + \beta_i(\Delta X_{it} / MV_{it-\tau}) + \varepsilon_{it} \qquad D\tau$$

$$(P_{it} - P_{it-\tau}) / P_{it-\tau} = \alpha + \beta_i(X_{it} / MV_{it-\tau}) + \varepsilon_{it} \qquad L\tau$$

Table 20

Correlation of The Change in ERC With Determinants Hypothesized To Explain Price Anticipation of Earnings

$D\tau = (P_{it} - P_{it-\tau}) / P_{it-\tau} = \alpha + \beta_i(\Delta X_{it} / MV_{it-\tau}) + \varepsilon_{it}$		τ = 1,2,3,4
$L\tau = (P_{it} - P_{it-\tau}) / P_{it-\tau} = \alpha + \beta_i(X_{it} / MV_{it-\tau}) + \varepsilon_{it}$		τ = 1,2,3,4
Spearman Correlation Coefficients		
	SizeMR	Trading.vol MR	BR MR
D2-D1	0.017	0.019	-0.434*
D3-D1	-0.270	-0.219	-0.551**
D4-D1	-0.172	-0.093	-0.291
L2-L1	0.168	0.059	-0.153
L3-L1	-0.107	-0.216	-0.236
L4-L1	-0.145	-0.186	-0.231
N	27	27	27
Pearson Correlation Coefficients		
	ln Mean Size	ln Mean TV	Bank RS
D2-D1	0.028	-0.001	-0.345
D3-D1	0.232	0.277	-0.395*
D4-D1	0.193	0.251	-0.267
L2-L1	0.124	0.166	-0.165
L3-L1	0.238	0.332	-0.148
L4-L1	0.252	0.362	-0.179
N	27	27	27

Notes: D1, D2, D3, D4, L1, L2 L3 and L4 are used to calculate an individual ERC for each firm from the accounting earnings observation period 1993-2001, the change in the esimates is matched with the mean rank of size (SizeMR), mean rank of trading volume (Trading.vol.MR), mean rank of the strength of the bank relationship (BR MR), the natural logarithm of the mean market value (ln Mean Size), the natural logarithm of the mean trading volume (ln Mean TV) and the mean ratio of loans from financial institutions to total shareholers' equity and liabilities for the firm between 1993-2001. * denotes significane at the 5% level (2-tailed), ** denotes significance at the 1% level (2-tailed).

where τ signifies the amount of leading period returns added to the dependent variable. Basically, ΔERC ($D\tau - D1$ or $L\tau - L1$, $\tau > 1$) is a measure of the information, relevant for the prediction of the earnings for time t, contained in the price between time $t - \tau$ and time $t - 1$ for each firm i. The bigger the ΔERC, the more a firm's stock price anticipates its earnings. Due to the small amount of firms in the sample, only 27 observations of each category of ΔERC are available for the calculations of the correlations.

Table 20 shows the results of calculating the correlation between the change in ERC and the determinants hypothesized to explain price anticipation of earnings. When calculating the Spearman correlation coefficients, every firm is given a mean rank based on its yearly ranking between 1993-2001 for each determinant. E.g. in terms of size it is the yearly mean rank in terms of market value on the first trading day of April between 1993 and 2001. It follows that a firm, which has a ranking of 10 has been the tenth biggest in terms of market value during the research period. Because we expect large firms to demonstrate larger price anticipation of earnings, there should be a negative correlation between ΔERC and the rank. We can see that this is the case especially as we increase the time span for which ΔERC is calculated. For the amount of trading volume in a firm's share, the analogy for calculating the mean rank is similar to market value and results very similar. The strength of the bank relationship determinant is measured so that a firm, which has a mean rank of 1 has had the lowest amount of loans from financial institutions divided by total shareholders' equity and liabilities during the research period. Therefore, relying on the hypothesis we should witness a negative correlation between ΔERC and BR MR.

Table 20 also includes Pearson correlation coefficients on the relation between ΔERC and the variables used to explain price anticipation of earnings. However, when calculating the Pearson correlation coefficients the natural logarithm of the mean absolute value of the determinant in question is used. E.g. for a firm X "ln Mean Size" is calculated by first calculating its mean market value based on the values measured on the first trading day of April in each year between 1993 and 2001 and the taking the natural logarithm of the measured mean value. The strength of this approach is that we use the absolute scale rather than relying on a ranking as in the other empirical designs used previously. Similarly to size, "ln mean TV" is the natural logarithm of the mean yearly trading volume in EUR for each firm measured between [1993-1994,…,2001-2002]. The "Bank RS" is simply mean of the absolute values calculated as [loans from financial

institutions/shareholders' equity and liabilities] for the year end financial statement between 1992-2000.

Based on the Spearman correlation coefficients in Table 20, the amount of relationship capital seems to have the best ability to predict cross-sectional variation in price anticipation of earnings. The same applies to the Pearson correlation coefficients. Although the results are statistically significant in only three of the 36 coefficients calculated, it is important to notice that the sign of the coefficients support all of the three determinants explaining price anticipation of earnings in a way predicted by the hypothesis the more leading year returns included in the dependent variable. The only exception is the information impounded in prices between *t-2* and *t-1* , which seems not to differ between the sample firms based on size, trading volume or relationship capital. This could mean that the differentiating effect of the determinants applies to prices anticipating earnings more than two years in advance. In other words, less than two years before the annual accounting earnings are released the stock market in Finland is able to price the share of all of the sample firms in a relatively similar manner relative to its earnings.

7. CONCLUSIONS

The main purpose of this paper was to study whether we can detect cross-sectional variation in price anticipation of earnings in the Helsinki Stock Exchange (HEX). Previous research has not addressed the issue in Finland although it might be particularly interesting to see whether the price formation process behaves similarly relative to earnings information in a small and relatively illiquid stock exchange as in large international market places. The study also contributes to the research field by testing whether we can detect the effect of relationship capital on the quality of a firm's information environment [Healy and Palepu (1993, 1995), Baiman and Verrecchia (1996), Frost (1996)] and consequently the ability of an individual firm's stock price to anticipate earnings. The hypothesis is based on previous work by Seppänen (1999) who has established that Finnish firms with a high degree of private debt make less frequent disclosure (i.e. forward-looking disclosures and timely documents of material information) and provide less timely annual earnings information.

Empirically speaking 'prices leading earnings' means that because stock markets anticipate most of the value-relevant information reflected in accounting earnings of year *t* already in years *t-1* and *t-2*, we can enhance the predictive power of a returns earnings regression using current period unexpected accounting earnings and current periods unexpected returns by including previous periods' returns in the dependent variable. The extent to which an individual firm's stock price is able to predict earnings is tied to the quality of its information environment, i.e. how much value-relevant information is available to investors about the company in general.

This study uses three determinants to measure the quality of a firm's information environment: size, trading volume and the amount of relationship financing. The empirical model used to measure the coefficient between returns and earnings, the earnings response coefficient (ERC), uses both the absolute change in earnings as well as earnings level as the independent variable to proxy for unexpected earnings. Unexpected returns, the dependent variable, are modelled both with raw returns and market adjusted returns. The choice of the methodological design in returns earnings association studies has been a subject of great debate in the 1990s. This study uses models that have been frequently used in the literature during the last decade [see e.g. Kothari (1992), Kothari and Sloan (1992), Donnelly and Walker (1995), Donnelly (1998), Kallunki and Martikainen (1997), Easton and Harris (1991, 1992)].

The empirical analysis is carried out by using a sample of firms listed continuously on the HEX Main List between 1.4.1990-1.4.2002. For the 27 firms that fit the criteria the following data are retrieved from various databases at use in the Helsinki School of Economics: yearly returns inclusive of dividends and adjusted for capital changes, published annual accounting earnings, COC (Finnish Committee for Corporate Analysis) adjusted annual earnings and yearly trading volume in EUR. The return and trading variables are measured between the first trading day of April in year *t* and year *t+1*. In addition, when testing for the effect of relationship capital to explain price anticipation of earnings the study uses the ratio of loans from financial institutions to total shareholders' equity and liabilities. These figures are calculated manually by using the companies' published financial statements.

The first stage of the empirical analysis included measuring the contemporaneous association between returns and earnings by regressing yearly returns inclusive of dividends (defined as unexpected returns) between the first trading day of April in year *t* and *t+1* to the published annual and COC-adjusted earnings of year *t* as well as the change in published annual and COC-adjusted earnings between year *t-1* and *t* (defined as unexpected earnings). The results indicate that adjusting the annual accounting earnings does not result in a higher explanatory power or ERC mainly because the published annual accounting earnings and COC-adjusted earnings do not differ significantly in the sample based on a t-test (p=0,05). When negative earnings observations are excluded the explanatory power of the model increases. This is consistent with investors considering negative earnings to be transitory because they have a put option on the assets of the firm [Hayn (1995)]. The obtained ERCs are larger than in Martikainen et al. (1997) who use a comparable methodology and data from HEX firms between 1974-1989, which could mean that the value relevance of published annual accounting earnings has increased in Finland during the last decade.

When leading period returns of up to three previous years are added to the dependent variable the ERC increases substantially compared to the contemporaneous setting. When all the observations are pooled and extreme one percent outliers are excluded the ERC increases from 0,616 to 5,929 when using the earnings level as the independent variable. Allowing for cross-sectional variation in the ERC yields an improvement from 3,786 to 8,072, respectively. Most of the improvement in the ERC seems to realise when two leading years' returns are added to the dependent variable. Using the difference in earnings as the independent variable significantly under performs the earnings

levels model in terms of the explanatory power of the regression model. Consequently it is not used when estimating the effect of the hypothesized determinants on the price anticipation of earnings.

Analysis on cross-sectional variation in the price anticipation of earnings was carried by using size measured by market value, trading volume in a share series and the ratio of loans from financial institutions to total shareholders' equity and liabilities to proxy for the quality of a firm's information environment. A dummy variable was used to differentiate between the ERC of all the firms in the sample and a control group. Testing for size the hypothesis was supported in terms of the share price of smaller firm's having a lesser ability to predict earnings compared to the rest of the sample, i.e. their ERCs increased the least when leading period returns were added to the dependent variable. However, large firms' prices did not have a better ability to anticipate earnings compared to the rest of the sample. For firms that had a lower amount of trading in their share series stock prices had a lesser ability to anticipate earnings. Similarly to the size proxy, the results do not support the most widely traded shares having a better ability to predict earnings compared to the rest of the sample. These results are in line with previous research conducted on the price anticipation of earnings [see e.g. Collins et al. (1987), Donnelly and Walker (1995) and Donnelly (1998)] and confirm that HEX behaves similarly to larger international stock markets in forming prices relative to value-relevant events that are realised in the accounting earnings of future periods.

In addition to the determinants previously used to explain price anticipation of earnings this paper contributes to the research field by measuring the effect of relationship capital on the information environment quality of a firm. In Finland, firms have traditionally used large amounts of bank debt and consequently had a strong relationship with their main source of capital. In this study it is hypothesized that firms that have maintained a stronger bank relationship in Finland during the sample period, which is measured by the total amount of loans from financial institutions relative to total shareholders' equity and liabilities, have showed a lesser tendency to adopt improved investor information practices and can be labelled as still having a "stakeholder" corporate governance approach. Based on previous empirical findings by Seppänen (1999) using Finnish data, these firms are less eager to publish voluntary disclosure which is hypothesized to enhance the quality of a firm's information environment.

The results support the hypothesis of firms with high amounts of relationship capital having a poorer quality information environment relative to the other firms in the sample, i.e. their share prices have a lesser ability to predict earnings. Most importantly, firms with low amounts of

relationship capital witness the largest increase in their ERCs when leading years' returns are added to the dependent variable. Thus, the relationship financing proxy seems to explain the price anticipation of earnings in both subgroups contrary to the size and trading volume proxy. The results prove that the observations made by Seppänen (1999) on the apparent lower quality information environment for firms with higher amounts of relationship capital in Finland are also evident in practice in the market's pricing process.

Empirical results of the effect of determinants on the cross-sectional variation in price anticipation of earnings is confirmed by correlating the change in the ERCs of individual firms with size, trading volume and the strength of the bank relationship. The change in ERC is measured by first approximating the contemporaneous returns earnings relation and then comparing it to results obtained by including leading years' returns in the dependent variable. Although the results are not significant partly due to small number of sample firms the correlation coefficients are of the right sign and support all three hypothesis.

The results in this thesis might be of interest to studies concentrating on the usefulness of analysts' earnings forecast, since proof is provided on analysts' earnings estimate horizon matching the period for which market's in Finland are able to efficiently price a firm's share vis-à-vis value relevant information realised in accounting earnings of future periods. Also firm-specific characteristics are important in defining the quality of a company's information environment and the amount its share price is able to predict earnings. This might be useful information for managers who have to consider the cost of different financing options as equity capital might not be optimally priced relative to the information available about future period performance available to insiders. The results also confirm the basic belief of investors relating to illiquid shares of small firms not being as efficiently priced as the shares of larger more widely traded firms, offering potentially high returns but at a greater risk.

Future research on the price anticipation of earnings should continue to concentrate on improving the empirical designs used. In relation to the firm-specific features explaining price anticipation of earnings, an equation including the absolute amount of the determinants on the 'right hand side' of the empirical design would contribute to the reliability of results. In Finland, the development of the stock market will in time make more accurate estimations of e.g. earnings components (persistence) possible based on historical earnings series, which will help in further elaborating on the prices leading earnings phenomenon.

8. REFERENCES

Albrecht W.S., Lookabill L.L. and McKeown J.C. 1977. The Time Series Properties of Annual Earnings. *Journal of Accounting Research*, 15, 226-244.

Atiase R.K. 1980. Predisclosure Informational Asymmetries, Firm Capitalization, Earnings Reports, and Security Price Behavior. *Ph.D. thesis, University of California, Berkeley.*

Atiase R.K. 1985. Predisclosure Information, Firm Capitalization and Security Price Behavior Around Earnings Announcements. *Journal of Accounting Research*, Spring 1985, 21-36.

Baiman S. and Verrecchia R.E. 1996. The Relation Among Capital Markets, Financial Disclosure, Production Efficiency and Insider Trading. *Journal of Accounting Research*, 34, 1-22.

Ball R. and Brown P. 1968. An Empirical Evaluation of Accounting Numbers. *Journal of Accounting Research*, Autumn 1968, 67-92.

Ball R. 1992. The Earnings-Price Anomaly. *Journal of Accounting and Economics*, 15, 319-345.

Ball R., Kothari S.P. and Robin A. 2000. The Effect of International Institutional Factors on Properties of Accounting Earnings. *Journal of Accounting and Economics*, 29, 1-51.

Ball R. and Watts R.L. 1972. Some Time Series Properties of Accounting Income. *Journal of Finance*, 27, 663-682.

Barth M.E., Beaver W.H. and Landsman W.R. 2001. The Relevance of the Value Relevance Literature for Financial Accounting Standard Setting: Another View. *Journal of Accounting and Economics*, 31, 77-104.

Bessembinder H., Chan K. and Seguin P.J. 1996. An Empirical Examination of Information, Differences of Opinion and Trading Activity. *Journal of Financial Economics*, 40, 105-134.

Basu S. 1997. The Conservatism Principle and the Asymmetric Timeliness of Earnings. *Journal of Accounting and Economics*, 24, 3-37.

Beaver W. 1968. The Information Content of Annual Earnings Announcements. *Journal of Accounting Research (Supplement)*, 6, 67–92.

Beaver W. 1972. The Behaviour of Security Prices and Its Implications for Accounting Research (methods), in the ''Report of the Committee on Research Methodology in Accounting''. *The Accounting Review (Supplement)*, 47, 407–437.

Beaver W. 1981. Market Efficiency. *Accounting Review*, January 1981, 23-37.

Beaver W., Lambert R. and Morse D. 1980. The Information Content of Security Prices. *Journal of Accounting and Economics*, 2, 3-28.

Beaver W.H., Lambert R.A. and Ryan S.G. 1987. The Information Content of Security Prices – a Second Look. *Journal of Accounting and Economics*, 9, 139-157.

Bernard V. and Thomas J. 1989. Post-Earnings Announcement Drift: Delayed Price Response or Risk Premium? *Journal of Accounting Research*, 27, 1–48.

Blevins D.R. and Schadewitz H.J. 1998. A Preliminary Analysis of the Semi-Strong Efficiency of the Helsinki Stock Exchange. *International Journal of Management*, 15, 181-187.

Bloomfield R.J. 1996. Quotes, Prices and Estimates in a Laboratory Market. *The Journal of Finance*, 5, 1791-1808.

Booth G. G., Kallunki J. and Martikainen T. 1996. Post-Anouncement Drift and Income Smoothing: Finnish Evidence. *Journal of Finance and Accounting*, 23, 1197-1211.

Booth G.G., Kallunki J.P. and Martikainen T. 1997. Delayed Price Response to the Announcement of Earnings and Its Components in Finland. *The European Accounting Review*, 6, 377-392.

Booth G.G., Lin J-C., Martikainen T. and Tse Y. 1997b. Trading and Pricing in the Finnish Upstairs and Downstairs Markets. *Paper presented at the 4th annual meeting of the Multinational Finance Society, Thessaloniki*, June 1997.

Brown S., Lo K. and Lys T. 1999. Use of R^2 in Accounting Research: Measuring Changes in Value over the Last Four Decades. *Journal of Accounting and Economics*, 28, 83-115.

Brown S.J. and Warner J.B. 1980. Measuring Security Price Performance. *Journal of Financial Economics*, 8, 205-258.

Bushman R.M. 1989. Firm Characteristics and Analyst Following. *Journal of Accounting and Economics*, 11, 225-274.

Bushman R.M., Piotroski J. and Smith A. 2003 (revised). What Determines Corporate Transparency? *University of North Carolina and Chicago, working paper*. Downloadable at www.ssrn.com.

Chaney P.K. and Jeter D.C. 1992. The Effect of Size on the Magnitude of Long-Window Earnings Response Coefficients. *Contemporary Accounting Research*, 8, 540-560.

Christie A.A. 1987. On Cross-Sectional Analysis in Accounting Research. *Journal of Accounting and Economics*, 9, 231-258.

Collins D.W. and Kothari S.P. 1989. An Analysis of Intertemporal and Cross-Sectional Determinants of Earnings Response Coefficients. *Journal of Accounting and Economics*, 11, 143-181.

Collins D.W., Kothari S.P. and Rayburn J.D. 1987. Firm Size and the Information Content of Prices With Respect to Earnings. *Journal of Accounting and Economics*, 9, 111-138.

Collins D.W., Kothari S.P., Shanken J. and Sloan R.G. 1994. Lack of Timeliness and Noise as Explanations for the Low Contemporaneous Return-Earnings Association. *Journal of Accounting and Economics*, 18, 289-324.

Dhaliwal D. and Reynolds S. 1994. The Effect of the Default Risk of Debt on the Earnings Response Coefficient. *The Accounting Review*, April 1994, 412-419.

Donnelly R. 1998. Cross-Sectional Variation in Price Anticipation of Earnings. *Journal of Business Finance & Accounting*, 25, 659-682.

Donnelly R. 2002. Earnings Persistence, Losses and the Estimation of Earnings Response Coefficients. *Abacus*, 38, 121-133.

Donnelly R. and Walker M. 1995. Share Price Anticipation of Earnings and the Effect of Earnings Persistence and Firm Size. *Journal of Business Finance & Accounting*, 22, 1-18.

Dumontier P., Mendés P. and Raffournier B. 2002. Accounting and Capital Markets: a Survey of the European Evidence. *The European Accounting Review*, 11, 119-151.

Dye R.A. 2001. An Evaluation of "Essays on Disclosure" and the Disclosure Literature in Accounting. *Journal of Accounting and Economics*, 32, 181-235.

Easley D. and O'Hara M. 1992. Time and the Process of Security Price Adjustment. *The Journal of Finance*, XLVII, 577-605.

Easley D. and O'Hara M. 1992b. Adverse Selection and Large Trade Volume: The Implication for Market Efficiency. *Journal of Financial and Quantitative Analysis*, 27, 185-207.

Easton P.D. and Harris T.S. 1991. Earnings as an Explanatory Variable for Returns. *Journal of Accounting Research*, 29, 19-36.

Easton P.D., Harris T.S. and Ohlson J.A. 1992. Aggregate Accounting Earnings Can Explain Most of Security Returns. *Journal of Accounting and Economics*, 15, 119-142.

Easton P.D. and Zmijewski M.E. 1989. Cross-Sectional Variation in the Stock Market Response to Accounting Earnings Announcements. *Journal of Accounting and Economics*, 11, 117-141.

Fama E. 1970. Efficient Capital Markets: A Review of Theory and Empirical Work. *Journal of Finance*, 25, 383-417.

Fama E., Fisher L., Jensen M. and Roll R. 1969. The Adjustment of Stock Prices to New Information. *International Economic Review*, 10, 1–21.

Fama E. 1991. Efficient Capital Markets: II. *Journal of Finance*, 46, 1575-1617.

Fama E. and French K. 1993. Common Risk Factors in the Returns on Stocks and Bonds. *Journal of Financial Economics*, 33, 3–56.

Fama E. and French K. 1995. Size and Book-To-Market Factors in Earnings and Returns. *Journal of Finance*, 50, 131-155.

Fishman M.J. and Hagerty K.M. 1989. Disclosure Decisions by Firms and the Competition for Price Efficiency. *The Journal of Finance*, 44, 633-646.

Foster G. 1986. Financial Statement Analysis. *Prentice Hall, Englewood Cliffs, N.J.*

Foster G., Olsen C. and Shevlin T. 1984. Earnings Releases, Anomalies and the Behaviour of Security Returns. *The Accounting Review*, 59, 574–603.

Francis J. and Schipper K. 1999. Have Financial Statements Lost Their Relevance? *Journal of Accounting Research*, 37, 319-352.

Freeman R.N. 1987. The Association Between Accounting Earnings and Security Returns for Large and Small Firms. *Journal of Accounting and Economics*, 9, 195-228.

Frost C.A. 1996. Characteristics and Information Value of Corporate Disclosure of Forward-Looking Information in Global Equity Markets. *Washington University, working paper.*

Gelb D.S. and Zarowin P. 2002. Corporate Disclosure Policy and the Informativeness of Stock Prices. *Review of Accounting Studies*, 7, 33-52.

Grossman S. 1976. On the Efficiency of Competitive Stock Markets Where Trades Have Diverse Information. *Journal of Finance*, XXXI, 573-585.

Grossman S. and Stiglitz J.E. 1980. On the Impossibility of Informationally Efficient Markets. *American Economic Review*, 70, 393-408.

Harris M. and Raviv A. 1993. Differences of Opinion Make A Horse Race. *The Review of Financial Studies*, 6, 473-506.

Hayn C. 1995. The Information Content of Losses. *Journal of Accounting and Economics*, 20, 125-153.

Healy P.M. and Palepu K.G. 1993. *Accounting Horizons*, 7, 1-11.

Healy P.M. and Palepu K.G. 1995. The Challenges of Investor Communication: The Case of CUC International Inc. *Journal of Financial Economics*, 38, 111-140.

Healy P.M. and Palepu K.G. 2001. Information Asymmetry, Corporate Disclosure and the Capital Markets: A Review of the Empirical Disclosure Literature. *Journal of Accounting and Economics*, 31, 405-440.

Heikkinen O. 2000. Stock Returns Around Earnings Announcements: Post-Earnings Announcement Drift and Return Reversals. *Helsinki School of Economics, Master's Thesis*, spring 2000.

Hendriksen E. 1965. Accounting Theory. *Richard D. Irwin Inc., Homewood, IL.*

Hietala P. 1989. Asset Pricing in Partially Segmented Markets: Evidence From the Finnish Market. *Journal of Finance*, 44, 697–718.

Holthausen R.W. and Watts R.L. 2001. The Relevance of the Value-Relevance Literature for Financial Accounting Standard Setting. *Journal of Accounting and Economics*, 31, 3-75.

Ihamuotila M. 1994. Corporate Ownership, Capital Structure and Investment – A Theory and Evidence. *Helsinki School of Economics and Business Administration, Doctoral Dissertation.*

Jacobson R. and Aaker D. 1993. Myopic Management Behaviour With Efficient, But Imperfect, Financial Markets: A Comparison of Information Asymmetries in the U.S. and Japan. *Journal of Accounting and Economics*, 16, 383–405.

Johnson M. F. 1999. Business Cycles and the Relation Between Security Returns and Earnings. *Review of Accounting Studies*, 4, 93-117.

Kallunki J-P. and Martikainen M. 2003. Earnings Management as A Predictor of Future Profitability of Finnish Firms. *European Accounting Review*, 12, 311-325.

Kallunki J-P., Martikainen M., Martikainen T. and Yli-Olli P. 1997. The Finnish Stock Market: A Survey of Some Empirical Evidence and Its Practical Relevance. *Liiketaloustieteen Aikakauskirja*, 4, 474-495.

Kallunki J-P. and Martikainen T. 1997. The Lead-Lag Structure of Stock Returns and Accounting Earnings: Implication to the Returns-earnings Relation in Finland. *International Review of Financial Analysis*, 6, 37-47.

Kasanen E. and Puttonen V. 1994. Suomalaisten Pörssiyritysten Sijoittajaviestintä. *Publications of the Helsinki School of Economics*, W-101.

Kandel E. and Pearson N. D. 1995. Differential Interpretation of Public Signals and Trade in Speculative Markets. *Journal of Political Economy*, 4, 831-872.

Keane S.M. 1985. Stock Market Efficiency: Theory, Evidence and Implications. *Phillip Allan Publishers, Oxford.*

Kettunen P. 1993. Financial Accounting and Reporting in Finland. *European Accounting Review*, 3, 592-602.

Kim Y.H., Willett R. J. and Jang J.I. 2002. Default Risk as A Factor Affecting the Earnings Response Coefficients. *Queensland University of Technology - School of Accountancy , Queensland University of Technology - School of Accountancy and Chung-Ang University, Working Paper.* Downloadable at www.ssrn.com.

Kinnunen J., Niskanen J. and Kasanen E. 2000. To Whom Are IAS Earnings Informative? Domestic Versus Foreign Shareholders' Perspectives. *The European Accounting Review*, 9, 499-517.

Korhonen A. 1975. Accounting Income Numbers, Information and Stock Prices: A Test for Market Efficiency. *Finnish Journal of Business Economics*, 42, 306-322.

Kormendi R. and Lipe R. 1987. Earnings Innovations, Earnings Persistence and Stock Returns. *Journal of Business*, 60, 323-345.

Koski J.L. and Michaely R. 2000. Prices, Liquidity and Information Content of Trades. *The Review of Financial Studies*, 13, 659-696.

Kothari S.P. 1992. Price-Earnings Regressions in the Presence of Prices Leading Earnings – Earnings Level Versus Change Specification and Alternative Deflators. *Journal of Accounting and Economics*, 15, 173-202.

Kothari S.P. 2001. Capital Market Research in Accounting. *Journal of Accounting and Economics*, 31, 105-231.

Kothari S.P. and Sloan R.G. 1992. Information in Prices About Future Earnings – Implications for Earnings Response Coefficients. *Journal of Accounting and Economics*, 15, 143-171.

Kothari S. P. and Zimmerman J. L. 1995. Price and Return Models. *Journal of Accounting and Economics*, 20, 155-192.

Kross W. and Shroeder D. 1989. Firm Prominence and the Differential Information Content of Quarterly Earnings Announcements. *Journal of Business, Finance and Accounting*, spring 1989, 323-345.

Kyle A.S. 1985. Continuous Auctions and Insider Trading. *Econometrica*, 53, 1315-1355.

Lambert R.A. 2001. Contracting Theory and Accounting. *Journal of Accounting and Economics*, 32, 3-87.

Lang M. and Lundholm R. 1993. Cross-Sectional Determinants of Analysts Ratings of Corporate Disclosure. *Journal of Accounting Research*, 31, 246-271.

Lang M. and Lundholm R. 1996. Corporate Disclosure Policy and Analyst Behaviour. *The Accounting Review*, 71, 467-492.

Leuz C. and Verrecchia R. 2000. The Economic Consequences of Increased Disclosure. *Journal of Accounting Research*, Supplement, 91-124.

Lev B. 1989. On The Usefulness of Earnings and Earnings Research: Lessons and Directions from Two Decades of Empirical Research. *Journal of Accounting Research*, 27 (Supplement).

Lev B. and Thiagarajan R. 1993. Fundamental Information Analysis. *Journal of Accounting Research*, 31, 190-215.

Lev B. and Zarowin P. 1999. The Boundaries of Financial Reporting and How to Extend Them. *Journal of Accounting Research*, 37, 353-385.

Livnat J. and Zarowin P. 1990. The Incremental Information Content of Cash-Flow Components. *Journal of Accounting and Economics*, 13, 25–46.

Madhavan A., Richardson M. and Roomans R. 1997. Why Do Security Prices Change? – A Transaction Level Analysis of NYSE Stocks. *The Review of Financial Studies*, 10, 1035-1064.

Martikainen M. 1998. Accounting Losses, Investors' Growth Expectations and the Association between Stock Returns and Accounting Earnings. *Acta Wasaensia (Doctoral Dissertation)*, No.61.

Martikainen T. 1993. Stock Returns and Classification Pattern of Firm-Specific Financial Variables. Empirical Evidence With Finnish Data. *Journal of Business Finance and Accounting*, 20, 537-557.

Martikainen T. and Ankelo T. 1990. On the Temporal Variation of Earnings Response Coefficients in the Finnish Stock Market. *University of Vaasa: discussion papers 117.*

Martikainen T., Ankelo T. and Ruuhela R. 1990. Stock Returns and Corporate Earnings Adjusted for Alternative Depreciation Methods. *Liiketaloudellinen Aikakauskirja*, 2, 109-127.

Martikainen T., Kallunki J-P. and Perttunen J. 1997. Finnish Earnings Response Coefficients: the Information Content of Losses. *The European Accounting Review*, 6, 69-81.

Martikainen T. and Puttonen V. 1993. Dynamic Linkages Between Stock Prices, Accrual Earnings and Cash Flows: A Cointegration Analysis. *Annals of Operations Research*, 45, 319-332.

Martikainen T., Rothovius T. and Yli-Olli P. 1993. On the Individual and Incremental Information Content of Accrual Earnings, Cash Flows and Cash Dividends in the Finnish Stock Market. *European Journal of Operational Research*, 68, 318-333.

Martikainen T. and Yli-Olli P. 1990. A Test of the Arbitrage Pricing Theory Using Accounting Information. *Economic Letters*, 34, 55-59.

Miller M. and Modigliani F. 1961. Dividend Policy, Growth and the Valuation of Shares. *Journal of Business*, 34, 411-432.

Miller M. and Rock K. 1985. Dividend Policy Under Asymmetric Information. *Journal of Finance*, 40, 1031-1051.

Mitchell M. and Mulherin J.H. 1994. The Impact of Public Information on the Stock Market. *Journal of Finance*, 49, 923-950.

Modigliani F. and Perotti E. 2000. Security Versus Bank Finance: The Importance of A Proper Enforcement of Legal Rules. *MIT Sloan School of Management and University of Amsterdam, working paper*. Downloadable at www.ssrn.com.

Myers S.C. 1977. Determinants of Corporate Borrowing. *Journal of Financial Economics*, 5, 147-175.

Nummelin K. and Vaihekoski M. 2002. World Capital Markets and Finnish Stock Returns. *The European Journal of Finance*, 8, 322-343.

Ohlson J.A. 1989. Accounting Earnings, Book Value and Dividends: The Theory of the Clean Surplus Equation (part 1). *Columbia University, working paper.*

Ohlson J. A. 1990. Ungarbled Earnings and Dividends. *Journal of Accounting and Economics*, 11, 109-115.

Petersen M.A. and Rajan R.G. 1994. The Benefits of Lending Relationships: Evidence From Small Business Data. *The Journal of Finance*, XLIX, 3-37.

Piippo M. 2002. Analyst Following in Finland. *Helsinki School of Economics, Master's Thesis*, spring 2002.

Rajan R.G. 1992. Insiders and Outsiders: The Choice Between Informed and Arm's-Length Debt. *The Journal of Finance*, XLVII, 1367-1399.

Ramakrishnan R.T.S. and Thomas J.K. 1995. Valuation of Permanent, Transitory and Price-Irrelevant Components of Reported Earnings. *Columbia Business School, New York, working paper.*

Rayburn J. 1986. The Association of Operating Cash Flow and Accruals With Security Returns. *Journal of Accounting Research (Supplement)*, 24, 112–133.

Ross S. A. 1976. The Arbitrage Pricing Theory of Capital Asset Pricing. *Journal of Economic Theory*, 13, 341-360.

Ross S.A. 1989. Information and Volatility: The No-Arbitrage Martingale Approach to Timing and Resolution Irrelevancy. *Journal of Finance*, 44, 1-18.

Rubinstein A. 1993. On Price Recognition and Computational Complexity in A Monopolistic Model. *Journal of Political Economy*, 101, 473-484.

Schadewitz H.J. 1996. Information Content of Interim Earnings Components – Evidence From Finland. *Journal of Business Finance & Accounting*, 23, 1398-1414.

Schadewitz H.J. and Kanto A.J. 2002. The Impact of Disclosure on the Market Response to Reported Earnings. *Scandinavian Journal of Management*, 18, 521-542.

Seppänen H.J. 1999. Discretionary Disclosure and External Financing: Evidence From A Relationship Financing Environment. *Helsinki School of Economics, Doctoral Dissertation*, Publications of the Helsinki School of Economics, A-161.

Vaihekoski M. 1997. The Finnish Stock Market: Recent Trends and Important Events. *Liiketaloustieteen aikakauskirja*, 4, 526-543.

Verrecchia R.E. 1979. On the Theory of Market Information Efficiency. *Journal of Accounting and Economics*, 1, 77-90.

Verrecchia R.E. 1982. Information Acquisition in A Noisy Rational Expectations Economy. *Econometrica*, 50, 1415-1430.

Verrecchia R.E. 2001. Essays on Disclosure. *Journal of Accounting and Economics*, 32, 97-180.

Warfield T. and Wild J. 1992. Accounting Recognition and the Relevance of Earnings as An Explanatory Variable for Returns. *Accounting Review*, 67, 821–842.

Watts R. and Zimmerman J. 1986. Positive Accounting Theory. *Prentice-Hall, Englewood Cliffs, NJ.*

APPENDIX 1

Sample Firms Quoted on the HEX Main List 1.4.1990-1.4.2002

Company *(former names during the sample period)*	Entry to the HEX Main List	Series Used*
Amer-Yhtymä Oyj**	14.3.1977	A
Birka Line ABP	12.5.1989	B
Citycon OYJ *(Kiinteistösijoitus OYJ Citicon)*	22.11.1988	
Fiskars OYJ	26.10.1951	A
Huhtamäki OYJ *(Huhtamäki Van Leer OYJ)*	21.12.1959	I
Instrumentarium OYJ	1.9.1971	A
Julius Tallberg-Kiinteistöt OYJ	18.2.1988	B
Kesko OYJ	15.5.1960	B
Kone OYJ	27.12.1961	B
Lassila&Tikanoja OYJ***	8.1.1961	
Lännen Tehtaat OYJ	8.9.1989	
M-real OYJ *(Metsä-Serla OYJ)*	2.1.1987	B
Nokia OYJ	1.9.1915	A
Norvestia OYJ *(SYP-Invest OY)*	4.3.1985	B
Outokumpu OYJ	27.10.1988	A
Partek OYJ	1.9.1915	
Raisio Yhtymä OYJ *(Raision Tehtaat OY)*	2.2.1989	V
Rautakirja OYJ	9.5.1988	A
Rautaruukki OYJ	20.10.1989	K
Silja Line OYJ *(EffJohn Oy, Neptun Maritime OYJ)*	1.9.1915	A
Stockmann OYJ	2.5.1942	B
Stromsdal OYJ	14.8.1989	B
Tamfelt OYJ	2.5.1942	Etu
Tamro OYJ *(Spontel Oy, Tamro-Yhtymä Oy)*	3.3.1986	
Tietoenator *(Tietotehdas Oy, TT Tieto Oy)*	1.6.1984	B
Uponor OYJ *(Asko OY)*	6.6.1988	A
Wärtsilä OYJ *(Lohja OY, Metra OYJ)***	21.10.1974	B

Notes: * if the company has had more than one share series issued or listed this is the one used for return calculation, it is the more widely traded series in total EUR, prior to 1993 the one restricted only to domestic shareholders is used, ** fiscal year prior to 1993 ended in the end of February, numbers adjusted for 1990-1993, ***split to new Lassila&Tikanoja OYJ and Suominen OYJ on 1.10.2001, both currently listed on the HEX Main List and 1 old share entilted to 1 new share in both companies, new L&T and Suominen OYJ considered as an entity for the final sample year, **** fiscal year prior to 1993 ended in the end of February, numbers adjusted for 1990-1993. Main sources of information: www.hex.fi, 'Pörssitieto' books (G. Kock) 1990-2000.

APPENDIX 2

The Difference Between Reported Earnings and COC-adjusted Earnings*

Reported accounting earnings for the fiscal year

+/- changes in inventory reserves

+/- changes in other reserves

+/- depreciation in excess of plan

+/- change in pension fund liabilities

- change in other funds not recorded in the income statement as expenses

+ change in other funds not recorded in the income statement as revenues

+/- other corrections

COC-adjusted total earnings for the fiscal year

Notes: Most of the difference between reported accounting earnings and COC-adjusted earnings can in practice be attributed to "depreciation in excess of plan". The difference can be characterized as a clear measure of earnings management in Finland [Kallunki and Martikainen (2003)]. The COC-adjusted earnings that were not available in the RIFE database were calculated from the published annual income statements of the companies. * The calculation principles for COC-adjusted earnings have not changed during the research period, this was checked from the "Financial Statement Analysis" –booklets that are published by the Finnish Committee for Corporate Analysis and include the recommendations for adjusting Finnish income statements.